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A Prototype and Feasibility Analysis of a Computer-based Construction Contract Administration System Using Framework II

(Developed for Use in the U.S. Navy, Civil Engineer Corps)

by

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ABSTRACT

The construction contract administrator generates a large volume of correspondence and documentation which is necessary for proper control and tracking of a project. This "paperwork" is difficult to track manually.

The paper reviews the Navy construction contracting organization and procedures and develops a model of the Navy contract administrator's functions. A prototype computer application called the "Contract Administrator's Electronic Notebook" was developed based on the model.

The prototype application system utilizes Framework II, an off-the-shelf, integrated, business software package and consists of a series of template databases, spreadsheets, and correspondence for the administrator to use in tracking typical contract information.

A feasibility analysis of the application determined it to be technically, functionally and economically feasible to expand and implement. Fully functional, the system is capable of handling up to 95% of contract administrators' functions which consume 50% of their time. The benefit to cost ratio for implementing the system is 6.8 for the first year. Implementation success hinges on Navy management support.

Implementation of the Contract Administrator's Electronic Notebook is recommended on a trial basis in local Navy construction contract offices and steps for implementation are outlined.

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CHAPTER 1

INTRODUCTION

Construction Management

The thought of "construction" brings visions of buildings, roads and craftsmen to mind which suggest that "construction management" is the management of project resources including time, equipment, materials and labor. While this is true, construction management also involves, to a large degree, planning and "paperwork" not directly related to field work. Paperwork refers to the written communications and documentation associated with a project. While construction involves a lot of doing, managing construction involves a lot of planning and paperwork. Unfortunately, the people who are best at "doing construction" are often the worst at paperwork. So the goal of overall good construction management is difficult to attain.

Further, considering that the management of construction also represents the management of contracts, then construction becomes increasingly paperbound. Everything from the contract bidding and award to material submittals, schedules, payments, insurance, and inspections involves extensive paperwork. Furthermore, in the case of government contracting, specifications designed to protect the public's interest dictate additional paperwork requirements and these requirements increase yearly as new

laws are enacted. This leaves the contractor and government contract administrator faced with managing a system increasingly clogged with paper.

Private contractors often react by hiring full-time "project administrators" whose primary job is to keep track of the growing sea of paper. The "project administrator" documents design changes and other government delays that can lead to profitable change orders. Contractors are pursuing change orders with increased vigor as the bidding climate becomes less favorable to them [Rosmond, 1984]. Consequently, the government contract administrator is now faced with not only managing increasing paperwork but also with an increasing number of contractor-requested change orders. This is reason to increase staff attention to contract progress and delays, but existing limited staff are overburdened and the future outlook for obtaining additional staff is bleak.

In these days of limited manpower and increasing work load, the challenge to the government contract administrator is to more effectively use available resources to manage contracts and protect the public interest. One answer is to automate administration and communications to make documenting, tracking, retrieval and forwarding of information more effective. Another answer is to look at the fundamental way the government currently does business and decide if there is a better way. In either case, the paperwork will not likely disappear. But, through

automation, revisions in retrieval of records will make more effective use of the contract administrator's time. For example, simple sorting of files to highlight the most important or urgent requirements, or delinquent correspondence can help administrators prioritize their efforts, to manage rather than react.

Military Construction Management

In the world of military construction, military officers and civilian government employees with backgrounds in engineering and special training in contracting manage construction contracts. Senior personnel with extensive contract experience are assigned as resident engineers to head regional offices responsible for managing and administering construction contracts in a geographic area.

Actually, military construction management includes two distinct yet intertwined jobs: "contract management" and "contract administration". Contract management refers to the legal contract documents and their execution: bids, plans and specifications, award documents and official change orders. Contract administration refers to the day to day monitoring and inspection of a project relative to its contract, to ensure timely and quality construction. A staff of contract specialists, contract administrators, and inspectors work together to oversee the completion of contracts, from bidding through turnover to the customer.

Procedures for procurement of military construction are detailed in many laws and DOD instructions but the primary guide today is the Federal Acquisition Regulations (FAR). Authority and responsibility is carefully delegated for each action in the procurement process and latitude for deviation is small. These regulations cover the management aspect of procurement in great detail but do not cover the day to day contract administration in much depth. FAR and other directives recommend many of the files required for good documentation of a project, but the use of important information for tracking is a matter of personal style. Thus the degree of administrator effectiveness varies.

Role of the Government Contract Administrator

The contract administrator's level of effectiveness is crucial since he is the key link between the government and the contractor and must deal daily with a multitude of parties toward successfully building a project. The world of the contract administrator is primarily paperwork: project documentation and communication about problems. He must act as an administrator as well as communicator, supervisor, coordinator, scheduler, and manager [Fisk, 1985; Moeller, 1985; O'Donnell, 1985; and Waraszawski, 1984]. Project quality control must be overseen, submittals reviewed, schedules and payments authorized, status reports prepared and questions answered. These tasks are complicated when they are combined with the difficulties of relating all this information to the different parties

involved in a construction contract. Whether it is the contractor, the designer, the user (owner), or another government agency, the information required is different depending upon the requesting party.

Documentation and communications are a crucial part of the contract administrator's role---everything that is done or said on a job could have future impact on claims, change orders or warranties [Elders, 1985; and Rubin and Banick, 1985]. In this vein, the administrator must be an organized and effective communicator and records must clearly show, years after completion, what happened and why and how decisions were reached. Communications can have an effect after completion and during construction as well. Timely and effective communications can reduce contract claims and improve contractor relations. The phrasing and the timeliness of a response can make or break contractor relations, even in telling a contractor "no" to a change or material submittal [Moeller, 1985].

The extensive communications and documentation required by a contract administrator generate many repetitious reports and correspondence to different parties, yet many times only one or two pieces of information change. It would therefore seem that a computer application is appropriate to both organize the contract administrator's duties, reduce work by automating repetitive reports and correspondence, and facilitate project documentation.

Role of the Computer in Contract Administration

While computers have been broadly adopted in the manufacturing industries, their adoption in construction has been much more limited. In construction management the major emphasis in computer applications has been in accounting, estimating and, to some extent, scheduling. In the past five years, with the advent of the microcomputer, literally hundreds of commercial software packages have come on the market. But the area of contract administration, from a documentation standpoint, is virtually ignored. A recent survey of 200 software packages for construction listed none in the administration area ["Construction Industry Software Inventory," 1986].

One commercial package was located that addressed project administration: The Project Manager's Assistant (PMA) by Wexpro Software Systems Company. This package features a series of databases and template forms. It is configured for use by an owner or contractor to track correspondence and submittals and to generate reports or transmittals for multiple projects. The system is based upon dBase III and is menu driven for ease of use. The format of the templates and databases is fixed and rather limited, but perhaps adequate for a small contractor. Wordprocessing capabilities are restricted to simple transmittal forms preformatted in the system.

The use of the computer could have great potential for improving the effectiveness of the contract administrator. This point has been stressed in textbooks but is only slowly being accepted in the field [Barrie, 1984 and Westney, 1985]. Two current user applications are cited as examples:

(1) The New York City Department of Environmental Protection uses IBM-AT computers in major projects to monitor detailed estimates, monthly payments, cash flow projections, change order status, concrete statistical results and correspondence. As a result of continuously identifying and notifying the responsible person to expedite contract correspondence, they established an excellent record of 95% on-time replies to contractors' correspondence [McGough, 1985].

(2) Project Development Management Associates Inc. (PDM) analyzed past construction claims and concluded that 13 areas of activities caused about 90% of the delays in project development and construction. To reduce these claims, PDM adapted off-the-shelf database management software to monitor construction. In one project for the construction of a 30-story luxury condominium building, owner redesigns were causing an average of 127 change order requests per unit. After installation of the monitoring system, there were still 2000 change order proposals but these were reduced to 400 actual change orders due to better documentation which clearly separated legitimate from

illegitimate requests, and no claims resulted since the parties agreed on the documentation ["Micros aid Management Team," 1985].

Recognizing the potential benefits of microcomputers, the U.S. Army Corps of Engineers (Corps) has been developing and implementing computer application programs for the last six years. These are based on commercially available software packages and are intended for use in contract field offices. The Corps' Construction Engineering Research Laboratory (CERL) aids in development, maintains a library of applications which are currently in use (see Appendix E), as well as publishing a microcomputer users' newsletter three times a year [O'Connor and Kruppenbacher, 1984; O'Connor, Kruppenbacher and Colwell, 1984; and Spoonamore, 1981]. The CERL applications are based on many different software packages and were developed by different field offices with varying levels of computer expertise. Applications range from limited contract administration functions to overall office management. They are primarily stand-alone database or spreadsheet applications and lack any sense of integration with the overall office function. Documentation for these applications is unpredictable due to their unsupervised development.

Objectives and Significance of this Research

The objective of this research is to demonstrate the possible uses of a commercially available **integrated** business software package by a Navy contract administrator as a professional productivity enhancement tool.

This paper concentrates on the Navy's system of construction contract management, specifically the contract administrator's duties, and ways to improve the administrator's performance by use of microcomputers. A model of a potential software application for a Navy contract administrator is developed. Then a prototype of the model is demonstrated using **Framework II**, a commercially available integrated business software package. Furthermore, the feasibility of implementing such a system is examined to determine the viability of the approach. Finally, recommendations are made on the potential of using commercially available software by a contract administrator.

This research is significant in that no such computer applications exist in the Navy Civil Engineer Corps. Also, research suggests that there is a general lack of knowledge of available software for microcomputers suitable for use in contract administration. Furthermore, as contractors become more sophisticated and/or automated, the Navy contract administrator will not only have to understand computer reports but will have to know how to use

microcomputer systems as well, to keep up professionally. (A 1985 survey revealed 69% of large contractors were using microcomputers ["Construction's Micro Boom," 1985].)

Organization of Report

The report presents information for readers both familiar and unfamiliar with the Navy and computers so some portions may seem elementary or redundant to the advanced reader.

Chapter 2 contains background material on the organization and operation of Navy contract administration and the duties undertaken by the contract administrator.

Chapter 3 develops a model of a proposed software application for use by the Navy contract administrator using the duties outlined in **Chapter 2**. Discussion of the information system's development is included.

Chapter 4 describes integrated software packages and reviews the current capabilities of commercially-available systems, with emphasis on Framework II.

Chapter 5 describes a prototype application system developed with Framework II using a sample project. Appendices include further descriptions of the application and system user documentation.

Finally **Chapter 6** presents a preliminary feasibility study of use of the proposed prototype by a Navy contract administrator and **Chapter 7** outlines recommendations and conclusions based on the research.

Appendices include a glossary of terms and acronyms, a user's guide to the prototype application system, system program listings, and a diskette.

CHAPTER 2

BACKGROUND TO NAVY CONSTRUCTION MANAGEMENT

This chapter will introduce information on the Navy's contracting organization and identify the key players and their roles. In addition, current and potential computer use by a contract administrator will be introduced.

Navy Construction Management

The major portion of Navy construction is administered through formally advertised, fixed-price civilian contracts and competitive bidding. Although the contractor is responsible for a project's completion, the Navy construction administrator is generally responsible for coordinating the timely completion of the project and meeting the user command's needs with an emphasis on quality and cost. The specific responsibility of the administrator is to ensure project construction as specified in the construction agreements.

Navy construction is a team effort with the construction administrator as a key link. Other key players are the facility designer, the user, and the contractor. Together they interact to complete a project; successful interaction is essential for the successful completion of a project.

Navy Organization Levels

Background in the Navy contracting organization is necessary for understanding the duties and problems of the contract administrator (See Figure 2.1).

The Naval Facilities Engineering Command (NAVFAC) is responsible for the design, construction, alteration, repair, and maintenance of all Navy Department shore activities. NAVFAC delegates authority to the commanders of six geographically defined Engineering Field Divisions (EFD) and a few Officers in Charge of Construction (OICC). OICC's generally have a larger scope of responsibility and a specific project or group of projects to administer such as building a new base or a large hospital. The Commanding Officers of the EFD in turn designate field staff, called Resident Officer in Charge of Construction (ROICC), with the responsibility for administering construction contracts at specific naval installations [Naval Facilities Engineering Command, 1979].

The ROICC office has the responsibility of administering contracts through a project engineer or Assistant Resident Officer in Charge of Construction (AROICC). The AROICC is supported by a staff of procurement/ contract specialists, project engineers, construction representatives/inspectors, and administrative personnel (See Figure 2.2). The AROICC is the key professional representative responsible for the direct administration of a construction contract.

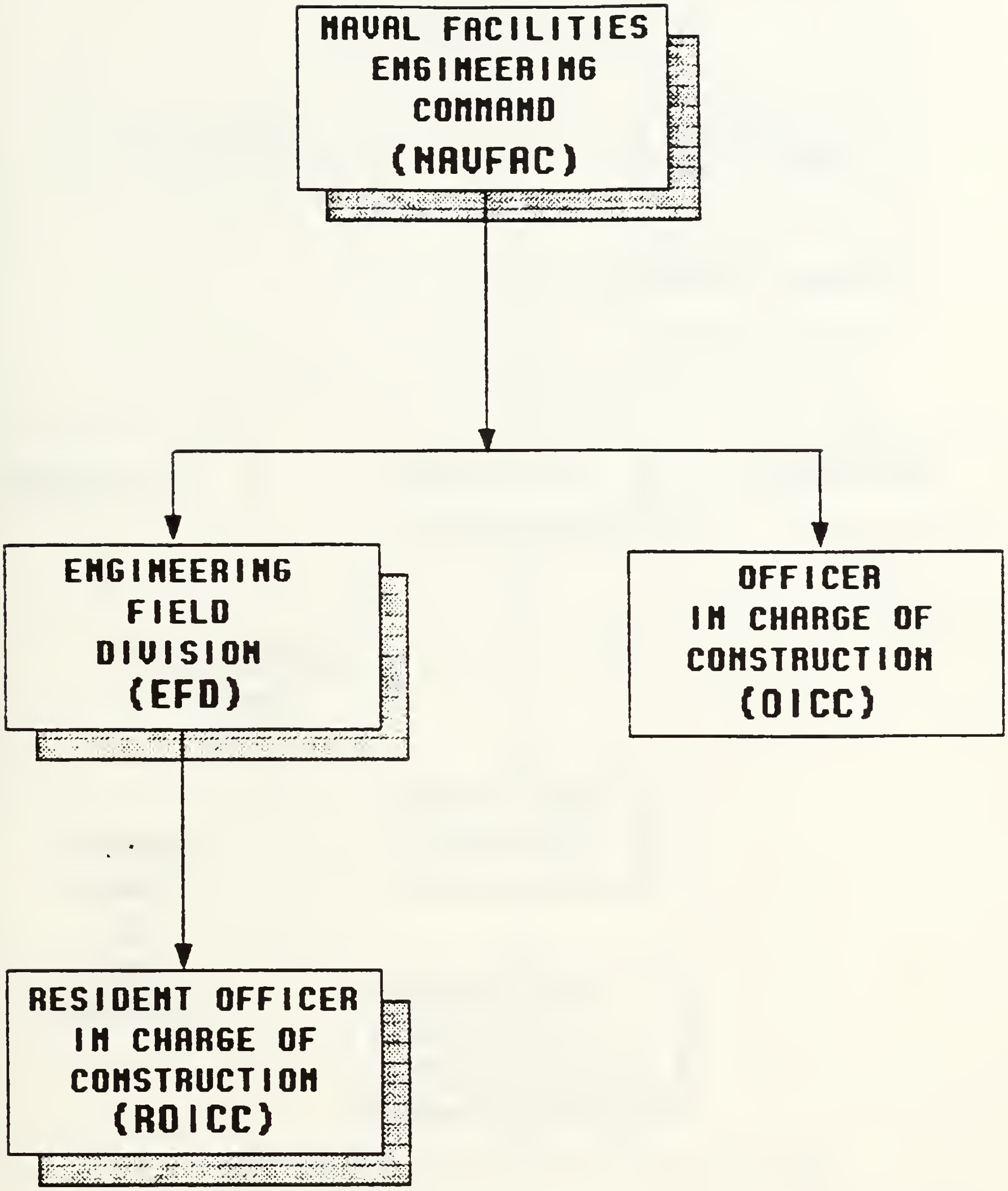

NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)
ENGINEERING FIELD DIVISION (EFD)
OFFICER IN CHARGE OF CONSTRUCTION (OICC)
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION (ROICC)

Figure 2.1 Naval Facilities Engineering Command Contracting Organization

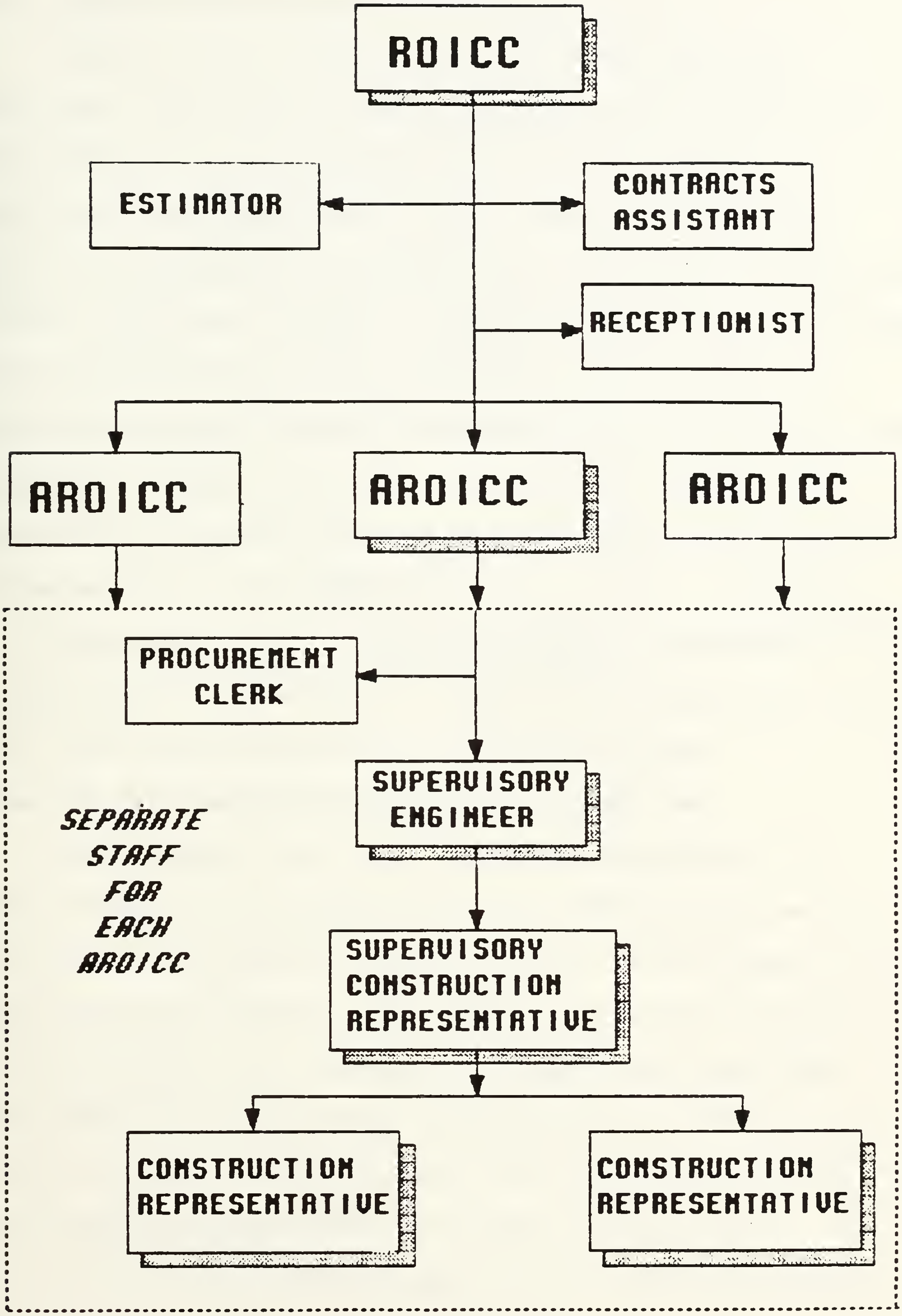

ROICC
ESTIMATOR
CONTRACTS ASSISTANT
RECEPTIONIST
AROICC
AROICC
AROICC
PROCUREMENT CLERK
SUPERVISORY ENGINEER
SEPARATE STAFF FOR EACH AROICC
SUPERVISORY CONSTRUCTION REPRESENTATIVE
CONSTRUCTION REPRESENTATIVE
CONSTRUCTION REPRESENTATIVE

Figure 2.2 ROICC Office Organization

Navy Contract Administrator Responsibilities

AROICCs act as first line interface between the government and the civilian contractors (See Figure 2.3). The AROICC is a professional construction manager responsible for administering the contract during the construction phase, from award until acceptance by the user command (customer). AROICCs ensure compliance with all plans and specifications; negotiate change orders, approve progress payments, coordinate scheduling conflicts with the base and oversee a staff of inspectors to ensure quality. Resolution of design and construction deficiencies occupy a large portion of the AROICC's time.

Each AROICC typically handles 15 to 20 separate contracts of various sizes at any one time and deals with many contract-related people and organizations.

Model of Navy Contract Administrator Functions

Each contract has similar project interfaces and administrative requirements which the AROICC must perform. Figure 2.4 outlines the duties and their time frames within the acquisition phases. The AROICC is primarily concerned with the construction phase of a project but does have influence in constructability reviews during the design phase, and final inspection and review of operating and maintenance manuals (O&M) during the turnover phase. The major duties outlined in Figure 2.4 are discussed below.

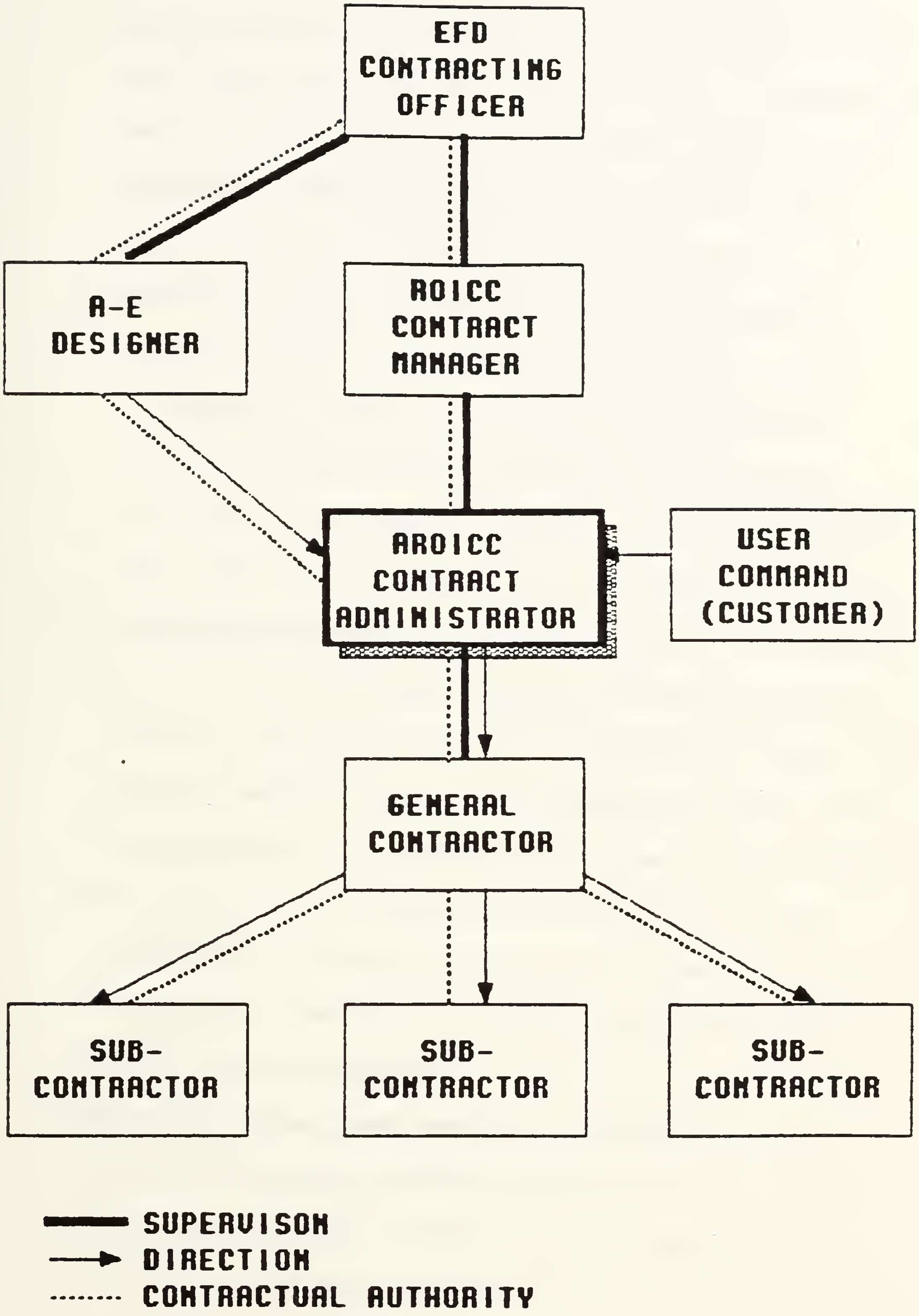


Figure 2.3 AROICC Organizational Chain of Command

(1) **Constructability review:** review of final plans and specifications for a new project to assure the design can be built and that specifications are adequate. The AROICC documents concerns and shortcomings in a memo to the designer.

(2) **Preconstruction conference:** meeting with all parties in the contract prior to start of work to ensure all special contract provisions are understood and base regulations are followed. The AROICC arranges the meeting by letter to the contractor and documents the proceedings.

(3) **Schedules review:** ensure contractor's schedule matches contract requirements and prices are in line with work divisions. The AROICC reviews the initial schedule prior to the start of work then reviews monthly updates when requests for payment are submitted. Standard transmittals to the contractor are used for approval unless drastic revision is necessary in which case a more formal letter may be required.

(4) **Material submittals and shop drawings review:** forward contractor submitted materials to A-E or EFD for approval if required, or approve and return to contractor in order to ensure they meet the contract requirements. The contractor

submits a log of all requirements early in the contract and the AROICC checks the log against the specifications then tracks incoming and outgoing submittals against the log.

(5) **Quality assurance:** supervise a staff of inspectors and review daily reports for problems and/or changes. The AROICC must be informed to stay ahead of any potential problems in the field.

(6) **Change order requests:** recommend approval or denial of requests from the contractor and customer. The AROICC reviews inspection reports, schedules and plans along with project correspondence to determine if a change is required, cost effective and compatible with the rest of the design. If found legitimate, the AROICC prepares a form letter with wording for a change order, and its justification.

(7) **Progress payment requests:** evaluate percentage complete with payment request and recommend payment based upon actual work in place. This ensures the contractor is not overpaid. Memo recommendations are forwarded to the ROICC for payment. Large differences between the authorized payment and request require a letter of explanation to the contractor.

(8) **Scheduling conflict coordination:** arrange for traffic diversions, utility outages, and security badges to ensure that a contractor's work does not interfere with base operations and that base operations do not delay the contract. This involves many phone calls and memos between the AROICC, base operations and contractor.

(9) **Design question resolution:** coordinate with A-E, customer and contractor on design interpretations to ensure that the project is completed as designed and meets customer requirements. This is accomplished with letters and transmittals between the parties with final written direction to the contractor coming from the AROICC.

(10) **Cost estimates:** prepare the government estimate for change order negotiation including a description of the change.

(11) **Negotiate change orders:** work with the contractor to achieve a satisfactory price and/or time adjustment for a change order.

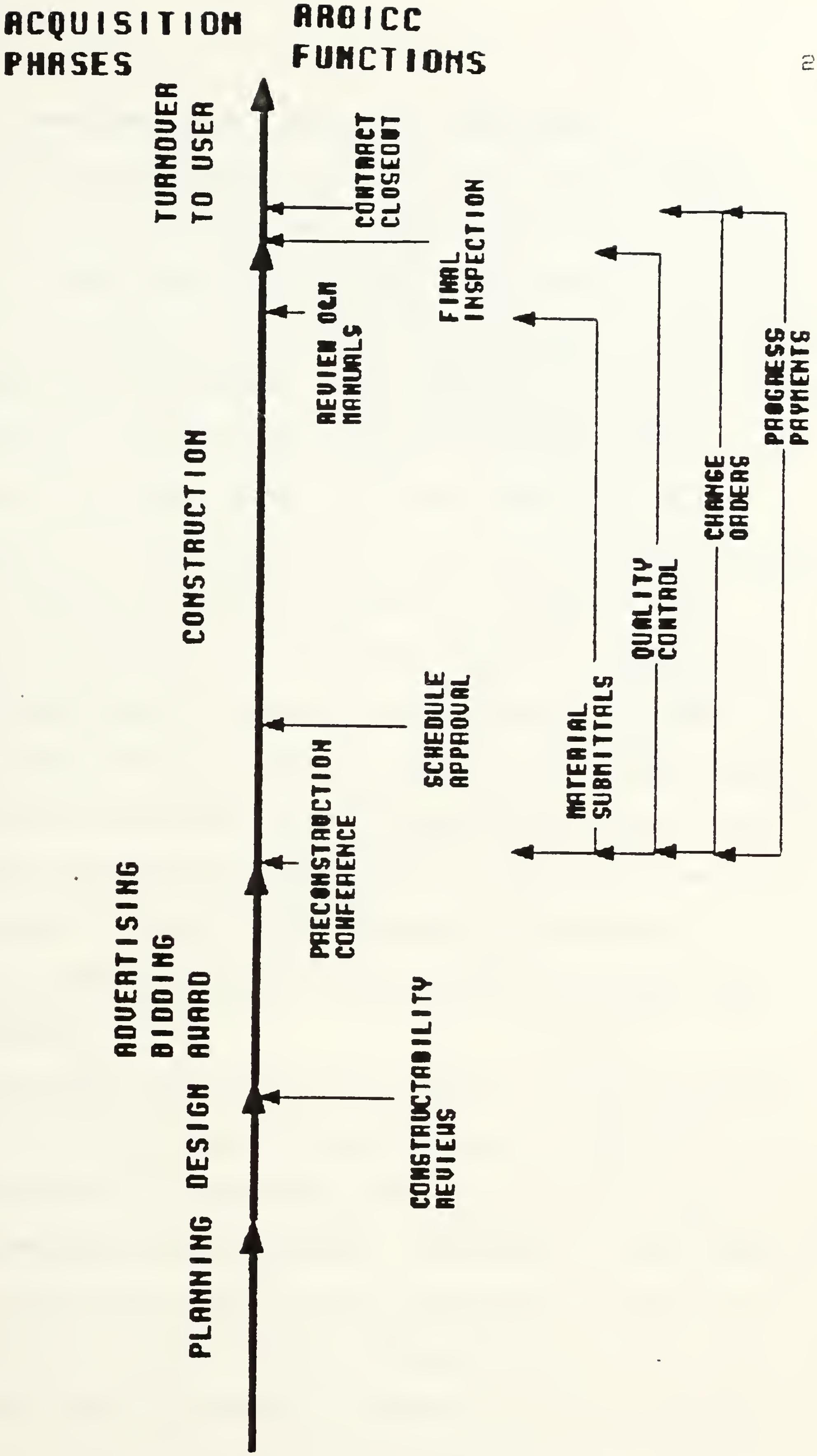


Figure 2.4 Typical Project Timeline

Contract Administrator Functional Interfaces

As the above suggests, a major part of an AROICC's duties is written and verbal communications between the members of the construction team. The largest percentage of communications during the construction phase is between the contractor and the AROICC. Figure 2.5 illustrates the types of communications and documentation exchanged between the AROICC and the other members of the construction team.

Information exchanged with the ROICC primarily concerns monthly updates of project progress and approval for payments. Interface with the EFD concerns contractual services performed by the A-E and approval of change orders. The A-E's involvement concerns review and approval of technical submittals, resolution of design questions and advising on technical change orders. The user command has other concerns primarily dealing with the scheduled completion date and change orders required to meet new requirements.

The primary communications channel is from the AROICC to the contractor; daily interface involves resolution of design questions in the field, schedule conflict resolution, quality assurance and payments. The AROICC's job requires a professional relationship at all times and an adversarial relationship is undesirable. The contractor's job is to build the project according to specifications and make a

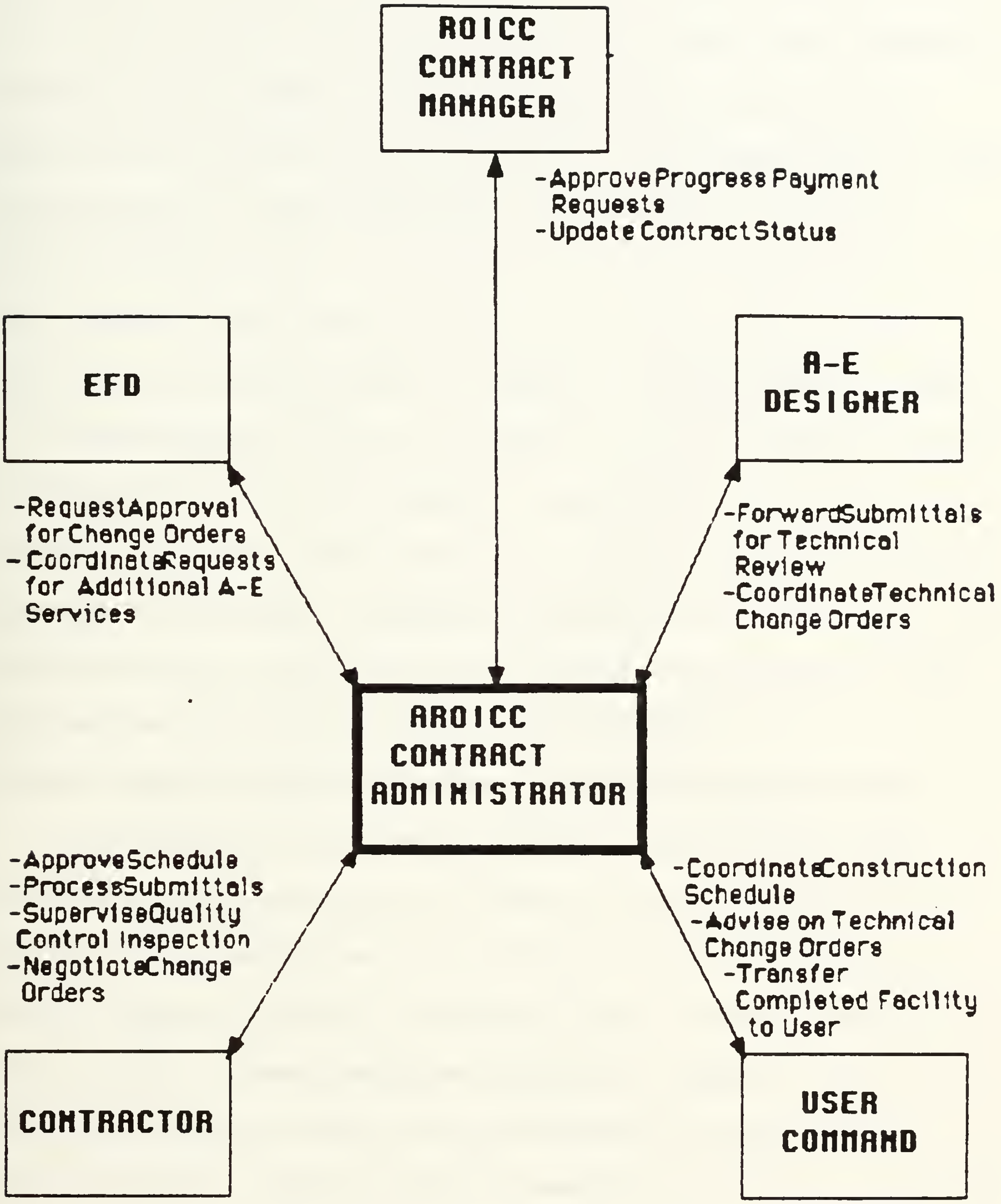

ROICC CONTRACT MANAGER
-Approve Progress Payment Requests
-Update Contract Status
EFD
-Request Approval for Change Orders
-Coordinate Requests for Additional A-E Services
A-E DESIGNER
-Forward Submittals for Technical Review
-Coordinate Technical Change Orders
AROICC CONTRACT ADMINISTRATOR
-Approve Schedule
-Process Submittals
-Supervise Quality Control Inspection
-Negotiate Change Orders
-Coordinate Construction Schedule
-Advise on Technical Change Orders
-Transfer Completed Facility to User
CONTRACTOR
USER COMMAND

Figure 2.5 Contract Administrator Functional Interfaces

profit. The AROICC's job is to assure quality and timely completion. The two jobs need not conflict. NAVFAC makes it clear that the contractor should be fairly and reasonably treated at all times. This includes prompt action and decisions on the part of the AROICC, with determination made on the basis of sound judgement, engineering principals and/or contract

requirements [Department of the Navy, Western Division, Naval Facilities Engineering Command. ROICC Manual, 1985].

Communication with all these parties generates volumes of documentation which require organization for effective retrieval and use. The importance of documentation discussed in Chapter 1 applies equally here. Many contractors are now using microcomputers to organize this information and communicate with the AROICC.

Current Computer Use by the Navy Contract Administrator

Computer-based and manual literature searches and interviews were conducted to gather current information on the use of microcomputers in construction management and contract administration in general and in the military, specifically. These searches revealed a general lack of information on the use of microcomputers in contract administration. The majority of sources uncovered pertained to project management such as scheduling and cost control rather than the administration of paperwork. Government

documents produced the best source of published information on microcomputer applications of commercial software in contract administration.

A limited number of examples of actual application usage in the field by private contract managers and public agencies were found. These represent a quasi-testimonial to the potential of microcomputer use in this field. Use of microcomputers to control quality assurance inspection reports in a large highway construction job was reviewed in one article [Chin, 1985]. A New York public agency supports use of microcomputers to track correspondence and contractor requests in construction projects [McGough, 1985]. Finally, a private construction management company advocates the use of off-the-shelf software for tracking construction documents to reduce claims ["Micros aid Managing Team," 1985].

An early study on the feasibility of using microcomputers in Army Corps of Engineers' construction offices was found [Spoonamore, 1981]. Further development of the feasibility study produced a Microcomputer Selection Guide for Construction Field Offices in which the Corps outlines criteria for selection and implementation of microcomputers [O'Connor, Kruppenbacher and Colwell, 1984]. This publication aided Corps' field offices in developing independent software applications which are now cataloged and advertised regularly by the Construction Engineering Research Laboratory ["USA-CERL Software Library Update,"

1986]. One Corps application uses microcomputers and Symphony integrated software for balancing resources in lengthy development projects [O'Connor and Golish, 1986].

Currently, most contract administration at the AROICC level is manual with little automation except in isolated applications where individual AROICCs have used personally-owned microcomputers. At higher levels in the ROICC organization, WANG computers transmit summary reporting data to higher authorities within the Construction Management System (CMS) and are used for office word processing within a ROICC office. Communications between a ROICC and the EFD are limited and generally only include project reports in terms of percentage complete, payments made, and change orders issued.. These are normally updated and submitted monthly. These reports determine EFD allocation of personnel and financial resources and are used to monitor EFD performance goals. They do not deal with the level of detail used at the AROICC level.

The director of information systems at the Western Division, Naval Facilities Engineering Command indicates there are plans for installing personal computers (PCs) in each ROICC office, as funds become available, however there are no definitive coordinated plans for their use [Villegas, 1987]. Each office is expected to independently define usage requirements and obtain and develop software. Limited EFD assistance in software selection will be available to

provide information on existing software packages and arrange group training on application software when requested.

Also located at the Western Division, Lieutenant Commander Rachko [Rachko, 1987], indicates that his previous research in this field using Lotus 1-2-3 for contract administration functions [Rachko, 1985], has not been implemented. Personal interest in the project exist, however military assignments outside the contract administration area have not permitted further development.

Limited assistance for the ROICC offices may also be available through the Facility Support Office (FACSO) in Port Hueneme. They help with microcomputer applications but the primary concern at this time is with interfacing PCs with the Naval Facilities Systems and other existing mainframe programs. This will permit ROICC office PCs to access NAVFAC mainframes to download information files from the mainframe. This would allow more timely access for the ROICC to information on the status of down stream projects in design and funding, and the tracking of change order proposals. But this will not support the AROICC's day to day project functions. FACSO has also made an initial investigation of a software model of AROICC functions but shortage of manpower is preventing further development [Manion, 1987].

One programer at the Northern Division, Naval Facilities Engineering Command, Philadelphia, has been working intermittently on the development of a database model which ROICC offices or any other group could adapt to process large amounts of data. Currently the application, based on dBase III, is used in several of the Philadelphia offices but no written documentation exists and the programmer stresses that the project is still in the developmental stages [Mouklas, 1987].

In general, EFD, ROICC and FACSO staffs are investigating microcomputer applications for the AROICC separately as a low priority and with little coordination and direction. Also, no one could be located within NAVFAC who is aware of the Army Corps of Engineers' efforts to develop applications for construction field offices or the manual, P-146, Microcomputer Selection Guide for Construction Field Offices. The general perception at the information managers level, based on several interviews, is that each ROICC office has different needs for microcomputer applications so no single model for an application package will be acceptable. They assume that each office will locally develop applications rather than learn and adapt someone else's. Alternatively, many AROICCs feel that there are many similarities between offices and the development of a computer application for AROICCs to use would be extremely useful and is long overdue.

Summary

The Navy contract management organization has an elaborate and complex system of interfaces which the contract administrator (AROICC) must work within to achieve the objective of completing a construction project on time, in budget and in conformance with the contract. The functions handled by the AROICC require a large volume of communication and, as a result, voluminous documentation to complete a project. The largest part of the communication is between the AROICC and the contractor. Many contractors are using microcomputers for administering contracts, however, there are currently no microcomputer applications for the AROICC and little is being done to develop any. There is a conflict in opinion within the Navy: some in management question the need for microcomputer applications for use by the AROICC, while AROICCs in the field feel the time for computer applications has arrived. Conversely, The Army Corps of Engineers, through its Construction Engineering Research Laboratory, has developed several useful but piecemeal aids for Army field offices.

CHAPTER 3

MODEL OF A PROFESSIONAL PERSONAL COMPUTER APPLICATION FOR THE NAVY CONTRACT ADMINISTRATOR

This chapter presents a model of a computer applications supporting an AROICC's functions. The chapter includes discussion of the processes used to identify the tasks for automation and selection of tasks for the prototype.

Identifying the Database for the Model

Assuming that it is possible to identify a model for a computer application system for use by the AROICC, the first step in the process is to identify the specific tasks and functions that would benefit from automation. There are two approaches to this task [O'Connor, Kruppenbacher, and Colwell, 1984]:

(1) Traditional Approach, identify functions that are now performed and prioritize their automation based upon the time and effort they require to develop and the frequency of their subsequent use or,

(2) Zero-based Approach, ignore current methods and functions and look objectively at input information available, output information required and what computer applications are available to achieve the desired results.

The traditional approach probably provides the most immediate saving in effort since it is easiest to visualize; however, the zero-based approach may have greater long term utility since it organizes information gathering and retrieval to reduce effort and still meet the operational requirements. Using the traditional approach in evaluating an AROICC's duties produced a task matrix summary of the potential paperwork functions for automation and their potential utility (See Table 3.1).

The matrix evaluates each task by an estimate of commonality (0-100% of the AROICC's projects), frequency of generation or referral (0-100%, days per month, average over project) and a value for the task based on the value of its computerization or return on time and effort to automate (0-1 rating). For example, preconstruction conferences may occur on 100% of an AROICC's projects (commonality) but the minutes may only be referred to 5% of the time (frequency) and the value of computerization may be very low, .3, (value of the task). On the other hand, a CPM schedule may occur on only 10% of the projects (commonality) and the frequency of referral may be low, 15%, yet the value of computerizing this task may be quite high, 1.0, (value of the task). A product of commonality, frequency and value represents the relative significance of that task for computerization.

Table 3.1

AROICC Task Matrix

TASK	COMMONALITY OF TASK (0–100%)	FREQUENCY OF REFERRAL (0–100%)	VALUE OF TASK (0–1)	WEIGHTED TOTAL
-Job Records Updating	**100**	**95**	**1.0**	**9500**
-Correspondence	**90**	**100**	**1.0**	**9000**
-Material Submittal & Shop Drawing Tracking	**100**	**80**	**1.0**	**8000**
-Change Order Preparation	**75**	**30**	**1.0**	**2250**
-Cost Estimates	**75**	**20**	**1.0**	**1500**
-Change Order Evaluation	75	30	.5	1125
-Quality Assurance	100	100	.1	1000
-Schedule Review	10	25	1.0	250
-Preconstruction Conferences	100	5	.3	150
-Negotiate Change Orders	70	10	.2	140
-Constructability Reviews	100	5	.2	100
-Progress Payments	100	15	.5	75

Note: Bold text indicates tasks chosen for the prototype.

Each potential user should realize that ranking of tasks is a subjective matter and what seems most time consuming or important to one may be relatively unimportant to another.

The highest weighted value tasks in Table 3.1, represented in bold type, are a set of sample computer applications developed in this research. The applications include:

(1) **Job Records Updating:**

Contract Record Card: includes general information about a contract such as description, names, addresses, phone numbers and contract value.

(based on 12ND WESTDIV 4330/56 (4-78) form)

Prospective Change Order Log: includes pending change orders in the system for a contract.

(based on 11ND WESTDIV 4330/17B (5-79) form)

Official Change Order Log: includes change orders approved for a contract along with the new contract value and completion date.

(2) **Correspondence Tracking:** represents a status log of all incoming and outgoing correspondence for a contract.

(3) **Material Submittal and Shop Drawing Tracking:** represents a status log of all incoming and outgoing material and shop drawing submittals for a contract.

(based on 12ND WESTDIV 4355/6 (Rev7-75) form)

(4) **Change Order Preparation:** represents a standard form letter used to forward a change order request to the OICC for approval. It includes the basic contract identification and description, government cost estimate and suggested wording for the change.

(5) **Cost Estimates:** represented by a standard cost estimate form for change orders less than $500,000.

(based on NAVFAC 4330/43 (6-82)form)

Table 3.2 represents a general listing of potential computer applications developed by CERL and is an indication of the scope that might be achieved with full automation. This list covers a broad spectrum of applications in a contracts office, from its overall office management down to the individual project submittal register. Not all of these applications would be of interest to an AROICC. Neither should this list be viewed as comprehensive of all possibilities.

Recognize that the list of tasks initially computerized is not final or definitive. Some tasks thought to have great potential for automation may be found to take as much

Table 3.2

Construction Office Computer Applications

Project Management

- Network Analysis System
- Construction Progress Schedule
- Progress Payments
- Physical Data
- Change Order Analysis
- Quality Control Information
- Potential Delay Factors
- Resource Management/Allocation
- Contingency Funds Management
- Procurement Tracking
- QA Inspection Schedule
- Environmental Data
- Claims Analysis
- Actual Progress

Contract Administration

- Modifications & Claim Status
- Submittal Registers
- Personnel Register
- Safety Data
- Payrolls
- General Contract Information
- Correspondence/RFI Tracking
- Engineering Calculations
- Subcontractors

Field Office Management

- S&I Costs
- Office Budgets
- Workload Management
- Vehicle Operations
- Personnel Data
- Training Plans
- Property Accountability
- Meeting Calendars
- Leave Schedules
- Recurring Correspondence
- Electronic Mail
- Local Information
- Technical Library
- Regulations & Policy Library
- Time & Attendance Data
- Organization Charts
- Travel Data
- Tickler File
- Small Purchases
- Visitor Schedule
- Quality Assurance Data

Source: O'Connor, Michael J., Timothy A. Kruppenbacher and Glenn E. Colwell. Microcomputer Selection Guide for Construction Field Offices. Technical Report P-146, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory, Champaign, Illinois, September,1984: 40.

time to perform by computer as by hand and therefore will drop from use. Conversely, experience with a computer may suggest new tasks to automate.

In one Corps of Engineers' office trial application using a minicomputer system to support a contracts office, sixteen functions were initially proposed for office automation. After several months of testing many were suspended from the system leaving only eight which are still utilized [Hitchings, 1984]:

-Submittal Register
-Contract Modification Data
-Status of Claims
-Contract Information
-Request for Information
-Construction Deficiencies
-Performance Evaluation Dates
-Training Records and Needs.

Note that while some of these functions appear on the AROICC task list for automation there are differences. No two offices are alike and these Corps applications include some office management tasks (Training Records) not included in an AROICC's duties.

Organizing the Information into a Model System

Once tasks for automation were identified, the traditional and zero-based analyses were combined. The procedures and forms used in each task were examined and common input elements were noted. These were used to

determine a common database without duplication of inputs. The result is a hybrid database which most closely resembles an "integrated system". Integrated systems automatically pass information required by multiple applications so entry of each element occurs only once.

The result of this effort was a matrix of tasks with common data elements identified and an organization to relate these elements (See Figure 3.1). These data elements represent the information which may be passed or cross-referenced between files and the arrows represent the logical direction of information flow. For example, to prepare a change order proposal, an estimate is required and must already have been prepared, and the contract must be awarded so a contract record card must already exist. Therefore, the information contained in the cost estimate file and contract record card file can be transferred to the change order proposal form application without leaving the system.

Computer Applications for the Prototype System

The next step in building a prototype system is to select the appropriate computer technique for each file. Some tasks may be performed by more than one technique but usually there is a preferred method. For example, spreadsheet and database applications can often be exchanged if the calculations are not complex.

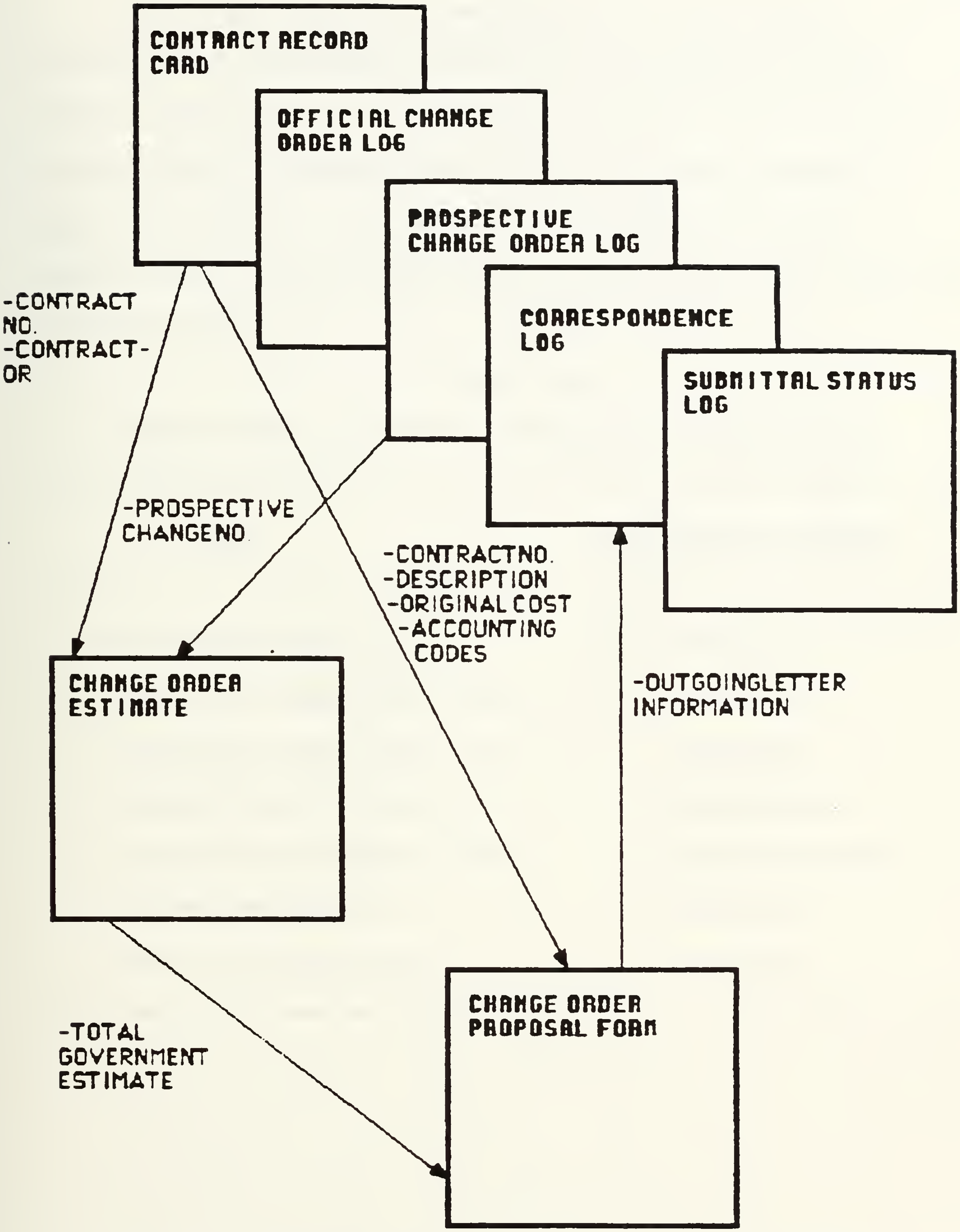


Figure 3.1 Model Organization with Common Elements Identified

Table 3.3 shows the ideal computer applications selected for the AROICC's prototype application system tasks. Databases are best suited to files which contain a large number of records and require retrieval based on specific criteria. Spreadsheets are used for number calculations and word processing is used for text files and correspondence.

Table 3.3

Model Tasks and Associated Computer Applications

TASK	COMPUTER APPLICATION
Contract Record Card	Database
Official Change Order Log	Database
Proposed Change Order Log	Database
Change Order Estimate	Spreadsheet
Change Order Proposal Form	Wordprocessing
Correspondence Log	Database
Submittal Status Log	Database

CHAPTER 4

INTEGRATED SOFTWARE FOR THE PERSONAL COMPUTER

The cost of developing and maintaining software is expensive and not effective unless the application is unique and the user base is very large. With the number and variety of commercially-available software packages on the market, it is more cost effective to utilize off-the-shelf software and adapt it to an application. Many selection techniques for software exist but all basically reduce to an evaluation system for analysis of the capabilities of a package to perform a desired task, the documentation provided, ease of use, and cost [Vyomesh, 1986a; Vyomesh, 1986b; and O'Connor, Kruppenbacher and Colwell, 1984].

Most of the software packages on the market are designed for one type of application: word processing, or spreadsheets, or databases, etc. The capabilities of these systems vary and cost is not necessarily an indication of quality. However, choosing one of these packages when it cannot perform all the tasks desired with ease forces compromise of capabilities. (Readers unfamiliar with these applications and the best uses for each should refer to the glossary.) Since the model contains several computer applications it is appropriate to examine "integrated software" that includes multiple applications.

Description

The term integrated software implies multiple applications working together. In the business world, the purpose of integration is to bring the major business computing applications together in such a way that uses can be interchangeably and quickly used without confusing the user.

Several approaches to integration have been developed: (1) operating environments, (2) all-in-one packages and (3) complementary product lines.

Operating Environments. Operating environments overlay an additional operating system on top of the computer Disk Operating System (DOS) which performs such tasks as window management and data exchange. They provide an interface between the user and the machine that allows the execution of separate unique applications. Vendors claim this is the most effective means of integration because it allows users to use their existing software programs (although new versions made for window operations may be required) with which they are familiar and avoid having to learn a new program in order to integrate applications. Problems encountered with this approach include difficulties different programs have "talking" to each other when they were not designed to do so, and the large amount of Random Access Memory (RAM) required for this operation.

All-in-one Packages. All-in-one packages provide a common environment with specific built-in applications with which to work. They utilize complex common file structures that enable different applications to interact without leaving the parent program. This approach is particularly helpful for novices who rely heavily on a product's ease of use and on-screen help. A principal benefit of the all-in-one approach is its use of a uniform command structure, usually in the form of a menu. This reduces learning time. Most of these packages contain the five most commonly used business applications: database management, spreadsheet, wordprocessing, graphics and communications.

The all-in-one approach is not a panacea for all business application problems however; it has its shortcomings as well. Along with the operating environments, all-in-one systems require a large amount of RAM to accommodate all the applications. In addition, their use of specific built-in applications can cause a loss of functionality in one or more of the applications.
As vendors attempt to "cram" as many as five applications under one heading, while limited by the users memory, some applications are doomed to suffer from inadequacy.

Complimentary Products. Ideally, complimentary product lines are separate individual application packages which provide for integration through a consistent user interface and command structure, as well as a single file format that eases the transfer of data between programs. In reality, complementary product lines are poor vehicles for integration because of their inability to easily transfer users from one application to another. Users must leave one program and enter another to transfer information and also contend with the different file formats created by each program.

Current Capabilities

For the manager who possesses limited computer skills and is concerned with a variety of tasks and functions, the all-in-one approach is probably the most effective type of integrated package. A number of all-in-one packages are available on the market. These range from spread sheet packages with limited graphics to full five function integration with additional features. Full common integration consist of word processing, spread sheets, databases, graphics and telecommunications. Table 4.1 displays a comparison of the three most popular fully integrated packages available for PCs.

The capabilities appear similar, thus it is difficult to choose software from comparison tables. Two important

Table 4.1

Comparison of Integrated Software

VENDOR/PRODUCT	The Software Group Enable	Ashton Tate Framework II	Lotus Development Corporation Symphony Version 1.1
OPERATING SYSTEM(S)/ ENVIRONMENT(S) SUPPORTED	MS-DOS or PC-DOS 2.0 and higher	MS-DOS or PC-DOS 2.0 and higher	MS-DOS or PC-DOS 2.0 and higher
SYSTEM CHARACTERISTICS			
Minimum memory required, bytes	256K	384K	384K
Suggested amount of memory, bytes	256K[1]	512K	640K
Memory taken by program after loading	—	—	Approximately 384KB
Special requirements	Graphics card [1]To run DBMS & SS concurrently—320K	None	IBM color graphics, Plantronics color card, Hercules card
MEDIA			
Media on which software is supplied	5¼" diskettes	5¼" diskettes	5¼" diskettes
Copy protected	No	Yes	Yes
Minimum storage requirements	360K dsdd diskette	720K	384K
Hard disk compatible	Yes	Yes, can be installed on hard disk	Yes
PROGRAM CHARACTERISTICS			
Applications supported	Data management, SS, graphics, WP communications	SS, WP, DBMS, Graphics, comm, outlining, program lang	WP, DBMS, SS, graphics, comm, Symphony Link (sync micro/mainframe)
Interaction with applications via menus	Yes	Yes	Yes
Pulldown menus	Yes	Yes	Yes (submenus)
Interaction with applications through commands	Yes	No	Yes
Interaction with applications via graphic icons	No	No	No
Mouse support	No	Via third party	No
Keyboard and mouse	No	Via third party[1]	No
Applications reside in memory simultaneously	No	Yes	Yes
Applications must always be accessed from disk(s) or diskette(s)	No	No	No
Simultaneous access to multiple applications	Yes	Yes	Yes
Access to applications w/o leaving initial program	Yes	Yes	Yes
Data exchange between applications	Yes	Yes	Yes
On-screen	Yes	Yes	Yes
Via a file conversion utility	Does not apply	Yes	No
Uniform commands throughout	Yes	Yes	Yes
Other	Menu generator	[1]set up to emulate cursor keys	Auto updates in data-related applications
WINDOWING FEATURES			
Maximum number of windows per screen	8	Limited by total RAM[2]	Unlimited
Overlapping windows	Yes	Yes	Yes
Automatic tiling	No	No	No
Discretionary tiling	No	Yes	Yes
Discretionary window placement	Yes	Yes	Yes
Discretionary window sizing	Yes	Yes	Yes
Horizontal windows	Yes	Yes	Yes
Verticle windows	Yes	Yes	Yes
Number of colors supported	10	16	4
Window scrolling	Yes	Yes	Yes
Segmented	Yes	No	No
Continuous	Yes	Yes	Yes
Other	User configurable SS	[2]including expansion cards or hard disk	
FILE COMPATIBILITY			
ASCII	Yes	Yes	Yes
DIF	Yes	Yes	Yes
DBF	Yes	Yes	Yes
SYLK	No	No	No
Lotus	Yes	Yes	Yes
Other	WordStar, Volkswriter, others	WordStar, Multimate, IBM DCA/DisplayWrite	
SUPPORT			
On-screen help menu available at all levels	Yes	Yes	Yes
On-screen interactive tutorial	Yes	Yes	Yes
Audio- and/or videocassette training package		Dealers only	
Demonstration diskette	Yes	No	Yes
Telephone support direct from vendor	Yes	Yes	Yes
Newsletters	Yes	Yes	No
Other		Books, seminars, 3rd party training mater	Lotus Magazine—free 1st 6 months
PRICING			
One time license or purchase price	$695[2]	$695	$695
Cost for new release(s)	$95/yr —updates	—	$75—upgrade
Cost of related programs	Does not apply	$495—dBase II[3]	$395—Symphony Link
Charges for support services	$20—disk replacement	—	No charge
Other		[3]$695—dBase III	$139—Symph Spell Check & Symph Text Outliner
INSTALLED DATA			
Date of first installation	October 1984	October 1985	July 1984
Number installed to date	—	—	—
Number currently shipped per month	—	—	—
COMMENTS	[2]Site licensing avail		Accesses up to 4MB of expanded memory

Source: "All About Integrated Software." Datapro Research Corporation report CM49-005 (October 1986): 116, 121, 125.

factors to consider are not presented: ease of use (how "user friendly" is the package?) and the quality of the program's documentation. Although two packages may appear identical, these factors can separate the good from the mediocre.

All three of these packages contain the five basic business applications. Enable utilizes a Master Control Module (MCM) to handle windows, files and macro management. Symphony utilizes the spreadsheet as the core of the system's operation (an outgrowth of the Lotus 1-2-3 spreadsheet program). It contains the facilities to manage the operation of the other applications. Framework II has no core application, but relies upon a common program language, called "FRED", to edit text, create user defined functions, call subroutines, insert prompts in programs, develop multi-line formulas and provide Help messages.

Datapro Research Corporation computer analysts rated these programs based on extensive in-house testing. Figure 4.1 illustrates the results of these tests based on their criteria. The overall rating summary gives Framework II the highest marks. It ranks number one in four of the six comparison categories including documentation which, as discussed earlier, is extremely important in software selection, particularly if the intended user has limited computer knowledge.

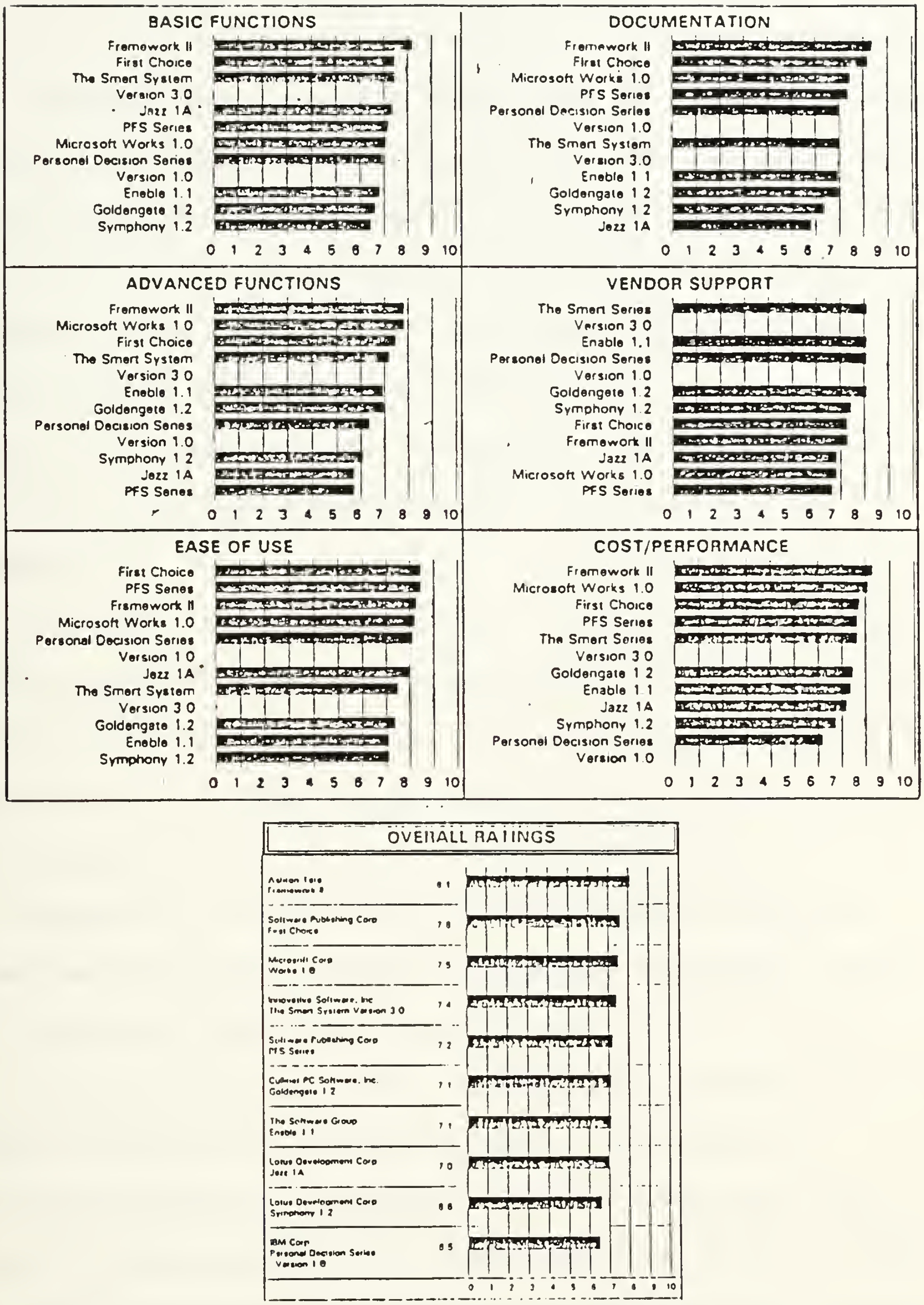


Figure 4.1 Integrated Software Ratings

Source: "Integrated Software Product Summary." Datapro Research Corporation report CM49-000 (January 1987): 501-2.

A fourth package occupying a large percentage of the market today is Innovative Software's Smart System version 3.0. Although the package claims to be an all-in-one program it is actually a system of compatible modules. Only a single application can reside in the RAM; accessing the other applications requires loading other program modules. In addition, the costs of all five application modules is several hundred dollars more than Symphony, Framework II or Enable. For these reasons it was not included in the comparison of all-in-one packages.

Framework II

Framework II was selected as the application software for this research due, in combination, to its high overall ratings, the author's familiarity with the program, and its availability. Similar results could be obtained by utilizing one of the other all-in-one packages.

Framework II is an all-in-one integrated software package designed for the IBM PC class of computers. The name is derived from the package's basic unit, a frame, which is similar to a window. The package consists of modules for word processing, spread sheet, graphics, database management, telecommunications, and additional frames for outlining and its language, Frame Editor (FRED), used for macro programming and for developing more complex applications.

The package may be used either in menu or command mode. The menus and commands are consistent throughout all modules and may be incorporated into the FRED programming language. User-defined macro and function key capabilities allow a user to enter a minimum of keystrokes to perform repetitious tasks.

Framework II runs on IBM PC, XT and AT and compatible machines with at least 384K RAM (640K is recommended), two 360K floppy disk drives or one 360K floppy disk drive and a hard disk drive, and PC-DOS version 2.0 or later.

Framework II promotes ease of use by incorporating such features as English-like menus, error messages and help screens. The documentation is excellent. It is not difficult to learn, it is natural in its operation, and it does not require extensive programming experience on the part of the user. The package should be considered by a user who needs a well-rounded integrated package.

Framework II Functions Used in the Prototype Application

The major functions of Framework II used in the prototype presented in the following chapter and their major features include:

(1) **Outlines:** the outline feature is used to contain and organize the entire prototype system. Macros, menus, databases, spreadsheets and word frames are all enclosed in one outline of frames.

(2) **Macros:** single-key functions are defined with macros to allow the user with limited knowledge of the Framework II program to enter, search, sort and edit data as well as print reports. They also provide for the use of full-screen menus and prompt lines to aid the user in using the system.

(3) **Wordprocessing:** template forms are incorporated using the wordprocessing function. Framework II allows data referencing in database frames to be merged in a word frame, see below.

(4) **Databases:** records for multiple projects are contained in databases which can be sorted and filtered to isolate subfiles, for example, that pertain to only one contract, or files that are before or after a certain date.

(5) **Spreadsheets:** repetitive numeric calculations such as cost estimate extensions are performed using spreadsheet functions.

(6) **Mailmerge:** the "mailmerge" function allows the template forms contained in word frames to be merged with data contained in the databases. This allows repetitive correspondence to be produced with ease. If the database is filtered to isolate one particular record and then mailmerged with the blank form, one letter is produced. If the database is not filtered, mailmerging will produce a form letter for each and every record in the database.

Other applications of Framework II were not incorporated in the prototype but may have merit in future expansion of the system. The graphics feature of Framework II allows basic business graphics such as bar charts, pie charts and x-y line graphs to be produced from data stored in a spreadsheet. This feature could have application in statistical management reports. Also not used in the prototype, was the telecommunication feature in Framework II which could have future use in electronic exchange of data between the AROICC and ROICC office.

Summary

The selection of software for a business application is not an easy task as today's market offers a variety of programs with varying levels of quality. The software must be selected carefully to ensure it will not only accomplish the desired tasks but will also be easy to learn and use. For the manager who needs a relatively easy-to-use package to accomplish a variety of functions, the integrated package may be the solution. All-in-one integrated packages offer multiple applications under one set of commands. Framework II is a leader in this market and was selected to develop this application prototype. The applications of outline, macros, spreadsheets, databases, wordprocessing and mailmerge were combined in the prototype. Chapter 5 illustrates a resulting prototype system.

CHAPTER 5

PROTOTYPE CONTRACT ADMINISTRATOR APPLICATION SYSTEM USING FRAMEWORK II

Scope of Application

The prototype application system designed is called the **Contract Administrator's "Electronic Notebook"** and is based on the Framework II program. The Electronic Notebook uses the FRED language in macro programs within Framework II to manipulate the databases, spreadsheets and text files defined in Chapter 3. The system is capable of storing and retrieving records for multiple-projects, computing repetitive calculations, and printing routine correspondence based on templates installed within the system. The system is interactive, menu driven, and allows the user to create, retrieve or edit files easily with little or no knowledge of Framework or programming.

The prototype centers around the change order process which includes the following tasks: searching correspondence of related information, developing the government estimate, preparing the "request for change" memo, and final updating of the job records with an approved change order number and increase/decrease in the value and time of the project. It is intended to exercise the range of capabilities Framework II offers and demonstrate the potential for system development with integrated software.

Information on multiple projects is stored within one file. The data files may be filtered and sorted to isolate information on a particular project, or they may be sorted by date to identify pending or delinquent action on all projects, or they may be sorted by contractor to identify all projects currently awarded to one company.

Operation of this application requires one copy of the Framework II program and the application disk contained in this report. Complete instructions for loading and operating the sample application system are contained in Appendix B.

Structure and Operation of the System

The entire application program is contained in one outline frame. Figure 5.1 illustrates the outline and the functions associated with the subsections.

Job Records, **Estimates**, and **Correspondence** represent menus with subselection items. **Macros** contains the macro programs used to manipulate the data files and entries. These allow the user to add, change, remove or print files as well as format date entries and return to the main menu or quit the program and put away all files. **Data Storage** contains the actual databases, spreadsheets and wordframes where information is stored. **Current Selection** merely stores the user's last menu selection for the macro programs to reference.

```
Job Records                              <-I
         Contract Record Card              I
         Job Correspondence Log            I
         Submittal Status Log              I
         Prospective Change Order Log      I    Menu Selections
         Official Change Order Log         I
Estimates                                  I
         Change Order Estimate             I
Correspondence                             I
         Change Order Proposal Form      <-I
Macros
         Add                             <-I
         Add Another                       I
         Change                            I
         Change Continue                   I
         Date                              I    Macro Programs:
         Remove                            I    those with bold
         Print                             I    first letters
         Print Selected Records            I    are main pro-
         Menu                              I    grams, others
         Quit                            <-I    are subroutines
Data Storage
         Contract Record Card Database           <-I
         Job Correspondence Log Database           I
         Submittal Status Log Database             I  Data File
         Prospective Change Order Log Database     I  Storage
         Official Change Order Log Database        I
         Change Order Estimate Spreadsheet         I
         Change Order Proposal Database            I
         Change Order Proposal Form Template     <-I
Current Selection                                <-   Stores
                                                      the name
                                                      of the
                                                      last menu
                                                      selection
                                                      for macro
                                                      use
```

Figure 5.1 Framework II Outline Listing of the Contract Administrator's Electronic Notebook

Example Project

The best way to explain the "**Contract Administrator's Notebook**" is by demonstration. The following example is intended to exercise the full range of the system's capabilities and illustrate the type of operations an AROICC would use on a typical project.

Functional Scenarios: -Electronic Notebook Operation

1. New contract assigned to AROICC:
    -Enter contractor and award data into **Contract Record Card** (See Figure 5.2.)
2. Schedule Preconstruction conference:
    -Enter outgoing notice in **Correspondence Log** (See Figure 5.3.)
3. Submittal log received from contractor:
    -Enter submittal requirements in **Submittal Status Log** after confirming requirements are complete and dates are reasonable (See Figure 5.4.)
    -Enter transmittal in **Correspondence Log** (See Figure 5.5.)
4. Request for change order received from contractor:
    -Enter proposed change description and number in **Prospective Change Order Log** (See Figure 5.6.)
    -Search **Correspondence Log** for any other entries under the same topic (See Figure 5.7.)

-Enter request letter in **Correspondence Log** (See Figure 5.8.)

-Generate government estimate on **Change Order Estimate** form (See Figure 5.9.)

-Enter estimate value in **Prospective Change Order Log** (See Figure 5.10.)

-Print **Change Order Proposal Form** with information from **Prospective Change Order Log**, **Estimate Form**, and **Contract Record Card** (See Figure 5.11.)

5. Change order approved:

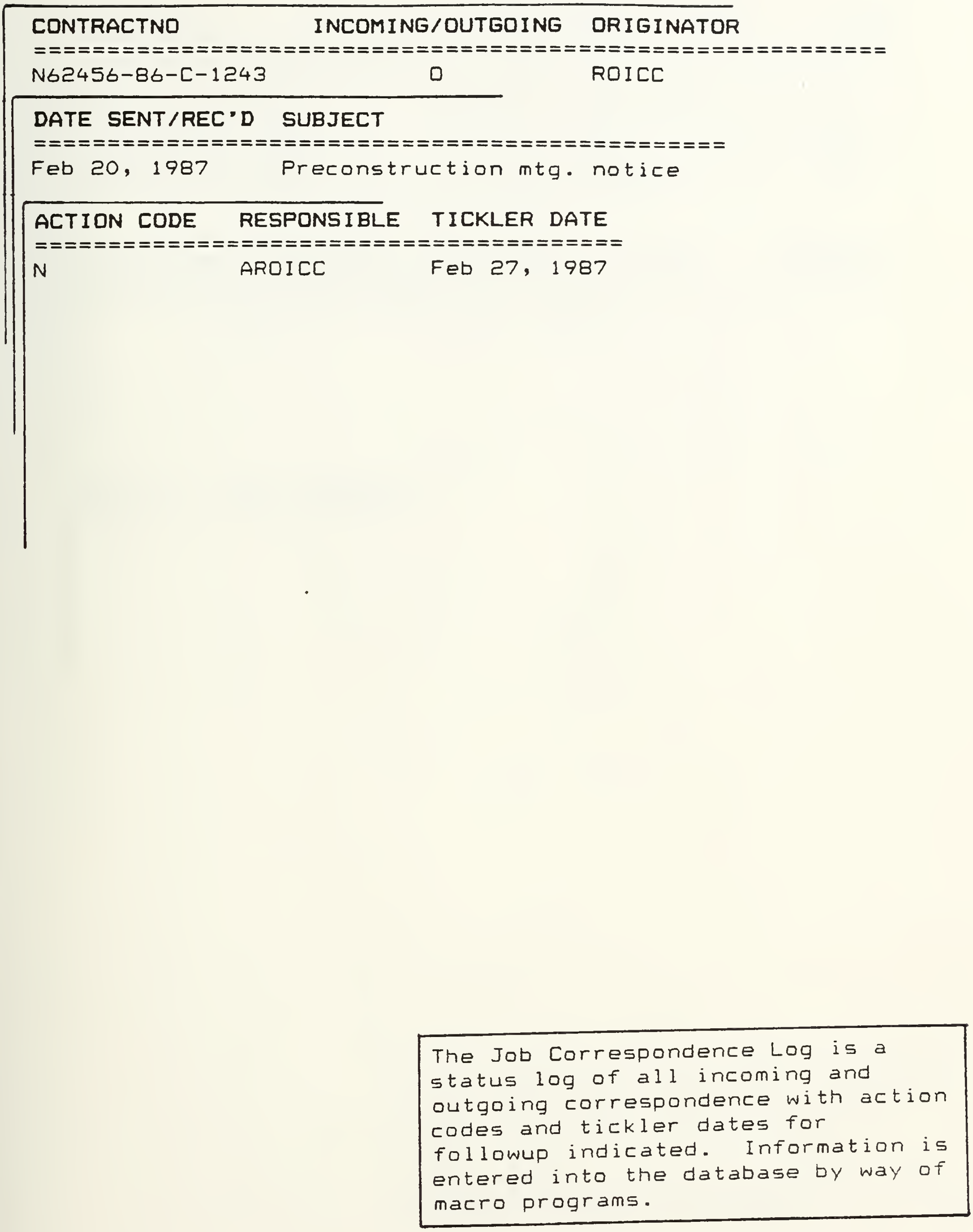
-Enter change order in **Change Order Log** to update value and time for contract (See Figure 5.12.)

This example suggests the type of documentation and information the AROICC is concerned with in the change order process. Each piece of incoming and outgoing correspondence must be tracked, changes in contract time and costs must be accounted for, and records must be readily available for cross-referencing and sorting based upon selected criteria. This particular process is a major activity of AROICCs and is estimated to occupy 20% of their time.

```
CONTRACTNO       DESCRIPTION
=================================================================================
N62456-86-C-1243Reroof Gym

CONTRACTOR                          CONADDRESS
=================================================================================
ABC Contracting                     453 Main St. Bremerton

POINT OF CONTACT  PHONE#          SUPT              JOB PHONE
=================================================================================
Jack Jones          456-9823        Jim Smith         876-3421

DATE AWARDED        AMOUNT        NUMBER DAYS CQC REF
=================================================================================
Feb 13, 1987      $132,000.00                  90 Bob

PLANS & SPECS BY   A/E PHONE      EIC              PHONE
=================================================================================
Acme Design       . 876-4532      Mary Front    765-8769

BONDING CO       ADDRESS                     INSURANCE CO
=================================================================================
A-1 Good Guys  124 Denny Way SeattlSkyhigh Insur.

EXPIRATION DATE APPROPRIATION    FUNDS AVAIL   CUSTOMER
=================================================================================
Jun 30, 1987     AA84375-830455   $150,000.00 NAVSTA

POC            PHONE
================================
Jonsey         457-3720
```

The Contract Record Card Represents general information about each contract such as the contractor's name and all points of contact involved in the construction process. It is a database where information is entered by way of macro programs.

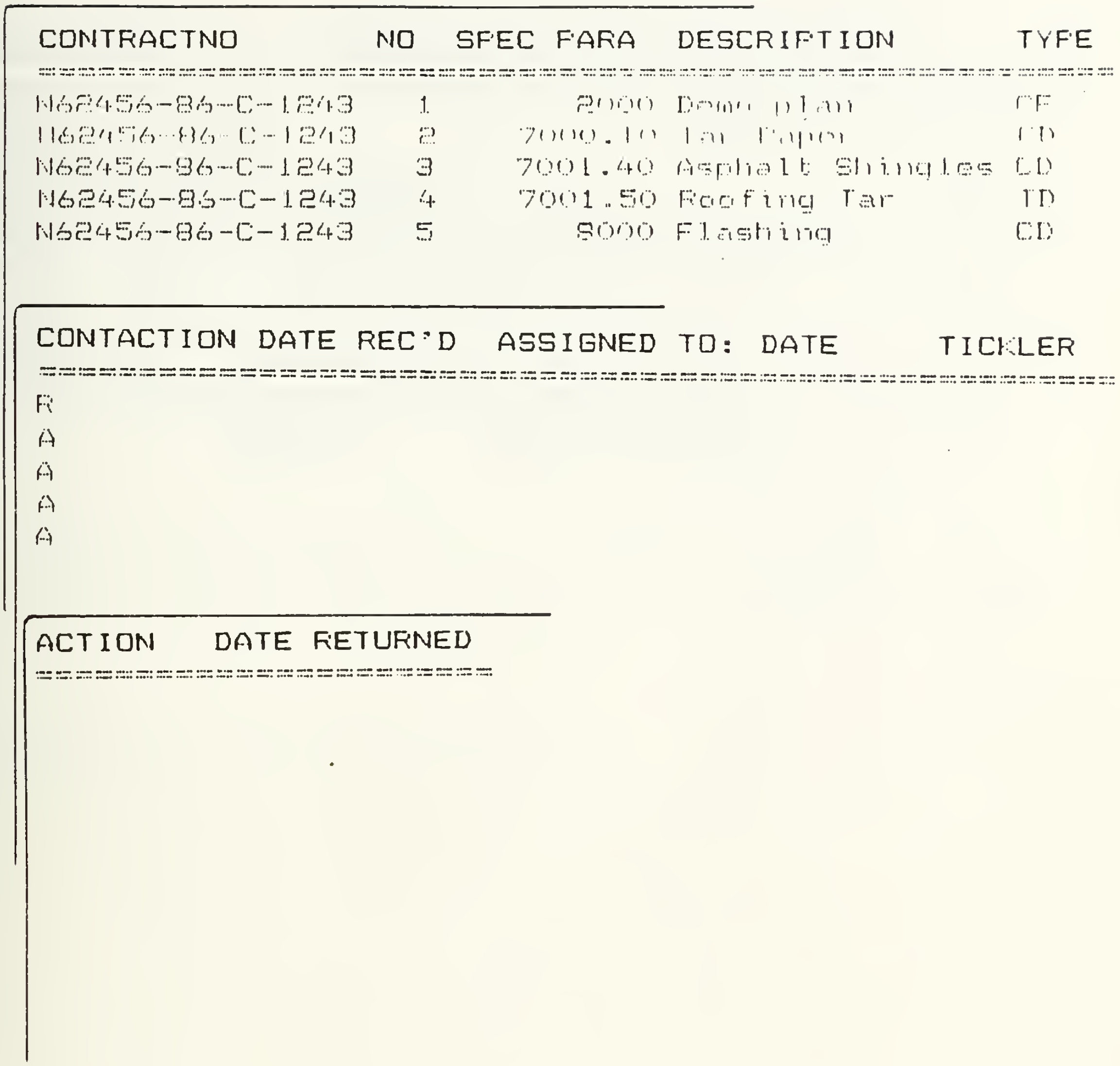
Figure 5.2 Example Project Contract Record Card



```
CONTRACTNO              INCOMING/OUTGOING  ORIGINATOR
======================================================================
N62456-86-C-1243                O          ROICC

DATE SENT/REC'D  SUBJECT
==========================================================
Feb 20, 1987     Preconstruction mtg. notice

ACTION CODE   RESPONSIBLE  TICKLER DATE
============================================
N             AROICC       Feb 27, 1987
```

The Job Correspondence Log is a status log of all incoming and outgoing correspondence with action codes and tickler dates for followup indicated. Information is entered into the database by way of macro programs.

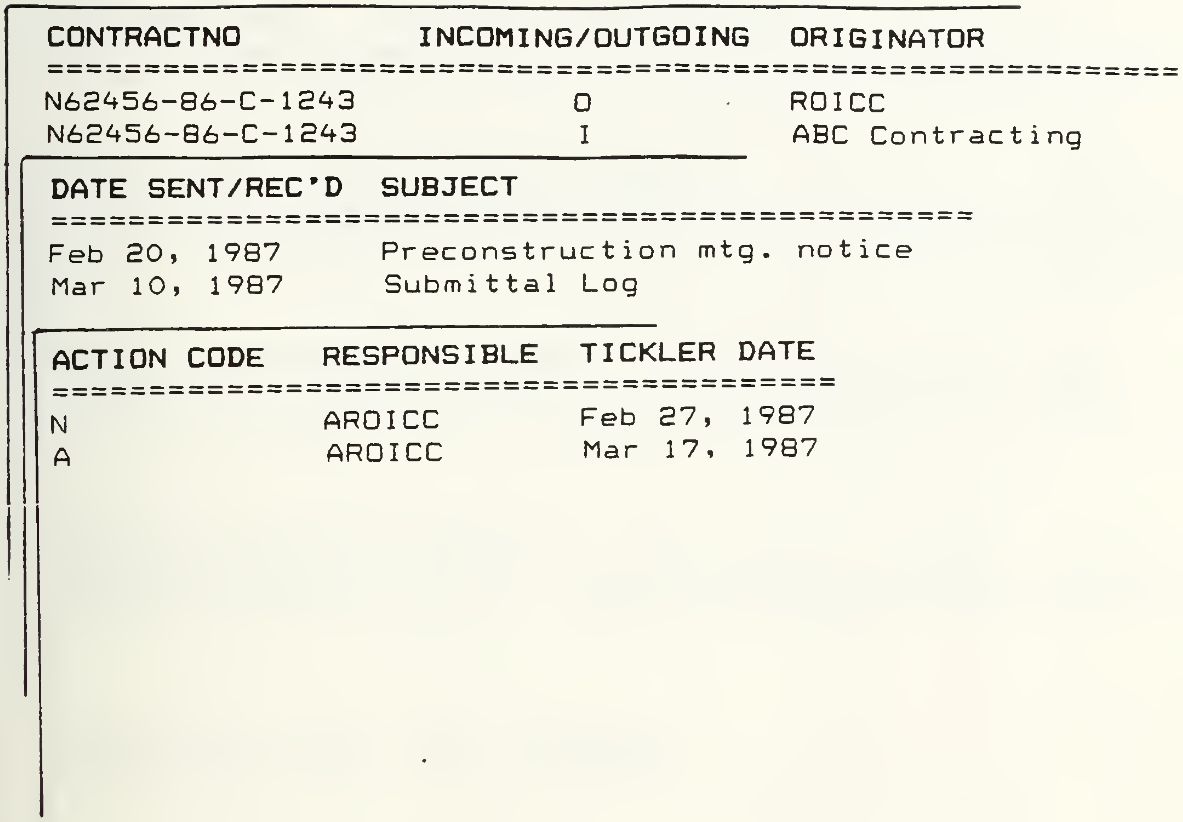
Figure 5.3 Example Project Job Correspondence Log #1



```
CONTRACTNO          NO   SPEC PARA   DESCRIPTION         TYPE
==================================================================
N62456-86-C-1243     1        2000 Demo plan            CF
N62456-86-C-1243     2     7000.10 Tar Paper            CD
N62456-86-C-1243     3     7001.40 Asphalt Shingles     CD
N62456-86-C-1243     4     7001.50 Roofing Tar          TD
N62456-86-C-1243     5        8000 Flashing             CD

CONTACTION DATE REC'D  ASSIGNED TO: DATE     TICKLER
==================================================================
R
A
A
A
A

ACTION   DATE RETURNED
=========================
```

The Submittal Status Log represents a list of required submittals for each contract and the status of each as they are received from the contractor. Input is accomplished by way of macro programs.

Figure 5.4 Example Project Submittal Log



```
CONTRACTNO            INCOMING/OUTGOING  ORIGINATOR
================================================================
N62456-86-C-1243              O          ROICC
N62456-86-C-1243              I          ABC Contracting

DATE SENT/REC'D  SUBJECT
=====================================================
Feb 20, 1987     Preconstruction mtg. notice
Mar 10, 1987     Submittal Log

ACTION CODE   RESPONSIBLE  TICKLER DATE
==============================================
N             AROICC       Feb 27, 1987
A             AROICC       Mar 17, 1987
```

The Job Correspondence Log after entry of the submittal log transmittal.

Figure 5.5 Example Project Job Correspondence Log #2

```
CONTRACT NO.    PCO NO.  DESCRIPTION
======================================================================
N62456-86-C-1243P001      Add Additional Flashing


FUNDS REQ'D -CONTR PROP:REQUESTED   RECEIVED    AMT($)
==============================================================================
Y                                  Apr 1, 1987 $500.00


TIME(DAYS) FUNDS?   X NO.       GOVT EST($) NTP DATE
==============================================================================
          5 Y


CHANGE ORDER:NEG DATE      DATE TO OICC C/O NO.  AMT($)
===================================================================================


TIME(DAYS) DATE ISS'D  REMARKS
============================================================
```

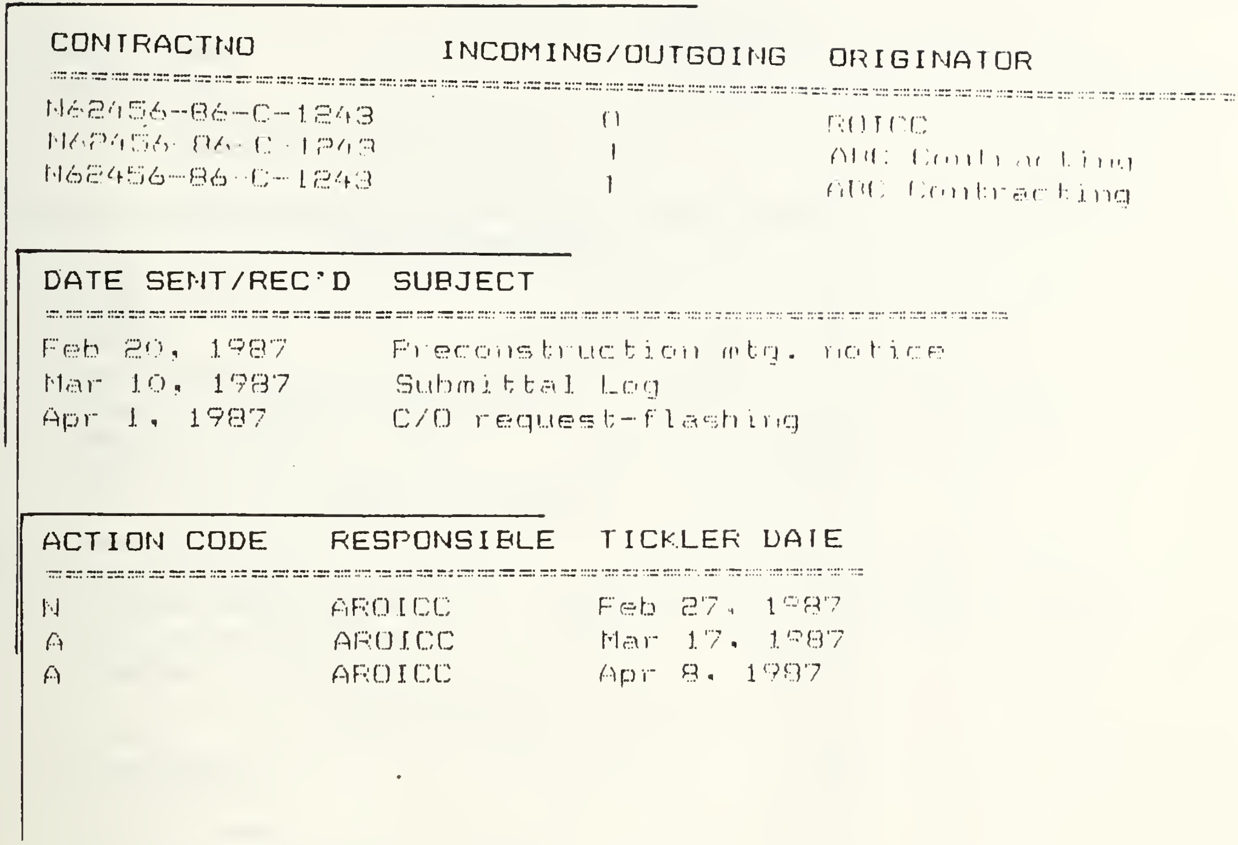
The Prospective Change Order Log represents a status log of all pending change orders. It tracks the status from initiation by the AROICC or contractor until negotiation and official signature of the change order documents.

Figure 5.6 Example Project Prospective Change Order Log #1

```
CONTRACTNO          INCOMING/OUTGOING  ORIGINATOR
=============================================================


DATE SENT/REC'D  SUBJECT
=================================================


ACTION CODE   RESPONSIBLE  TICKLER DATE
=========================================
```

This Job Correspondence Log represents all records containing the word flashing in the subject field, zero. It is the result of filtering the database.

Figure 5.7 Example Project Correspondence Log Filtered on Subject=*flashing*



```
CONTRACTNO                   INCOMING/OUTGOING   ORIGINATOR
======================================================================
N62456-86-C-1243                     0           ROICC
N62456-86-C-1243                     1           ABC Contracting
N62456-86-C-1243                     1           ABC Contracting
```

```
DATE SENT/REC'D   SUBJECT
==========================================================
Feb 20, 1987      Preconstruction mtg. notice
Mar 10, 1987      Submittal Log
Apr 1, 1987       C/O request-flashing
```

```
ACTION CODE    RESPONSIBLE   TICKLER DATE
==============================================
N              AROICC        Feb 27, 1987
A              AROICC        Mar 17, 1987
A              AROICC        Apr 8, 1987
```

Job Correspondence Log after receipt of request for change order.

Figure 5.8 Example Project Job Correspondence Log #3

```
DATE:                                                  Apr 5, 1987
CONTRACT NUMBER:                                       N62456-86-1243
CONTRACT TITLE:                                        Reroof Gym
CHANGE DESCRIPTION:
          Add additional flashing to roof

**********************************************************************
________________________PRIME CONTRACTOR WORK__________________
1. LABOR                                                          100
2. FRINGE BENEFITS                                                 43
3. MATERIAL                                                        50
4. RENTAL EQUIPMENT                                                 0
5. OPERATING & MINOR MAINT. FOR OWNED EQUIP.                        0
6. SUBTOTAL (1+2+3+4+5)                                           193
7. FIELD OVERHEAD (   % OF LINE 6)                              19.30
8. LIABILITY & COMP. INSURANCE (   % OF LINE 1)                     1
9. SUBTOTAL (6+7+8)                                            213.30
10. HOME OFFICE OVERHEAD (   % OF LINE 9)                        6.40
11. EQUIPMENT OWNERSHIP EXPENSE                                     0
12. SOCIAL SECURITY & UNEMPLOYMENT INS. ( % OF LINE 1)           7.50
13. SUBTOTAL (9+10+11+12)                                      227.20
_______________________SUBCONTRACTORS WORK____________________
14. LABOR                                                          50
15. FRINGE BENEFITS                                                20
16. MATERIAL                                                        0
17. RENTAL EQUIPMENT                                                0
18. OPERATING & MINOR MAINT. FOR OWNED EQUIP.                       0
19. SUBTOTAL (14+15+16+17+18)                                      70
20. FIELD OVERHEAD (  % OF LINE 19)                              2.10
21. LIABILITY & COMP. INSURANCE (  % OF LINE 14)                  .50
22. SUBTOTAL (19+20+21)                                         72.60
23. HOME OFFICE OVERHEAD (  % OF LINE 22)                        2.18
24. EQUIPMENT OWNERSHIP EXPENSE                                     0
25. SOCIAL SECURITY & UNEMPLOYMENT INS. (% OF LINE 14)           3.75
26. SUBTOTAL (22+23+24+25)                                      78.53
27. PROFIT (   % OF LINE 26)                                     4.71
28. SUBTOTAL (26+27)                                            83.24
___________________________SUMMARY____________________________
29. PRIME CONTRACTOR'S WORK                                    227.20
30. SUBCONTRACTOR'S WORK                                        83.24
31. PRIME CONT. OVERHEAD ON SUBS WORK (  % OF LINE 30)           2.50
32. SUBTOTAL (29+30+31)                                        312.94
33. PRIME CONTRACTOR'S PROFIT (   % OF LINE 32)                 18.78
34. SUBTOTAL (32+33)                                           331.71
35. PRIME CONTRACTOR BOND PREMIUM (   % OF LINE 34)              3.32
36. TOTAL COST (34+35)                                         335.03
**********************************************************************
ESTIMATED TIME EXTENSION AND JUSTIFICATION:
Additional flashing required to replace deteriorated existing.
Not shown on plans.  Unforeseen.
```

The Change Order Estimate form is an extension of the government cost estimate based on user input percentages for all variables (the lines where a % sign is indicated) and entry of direct labor, material and equipment costs.

Figure 5.9 Example Project Change Order Estimate

```
CONTRACT NO.    PCO NO.  DESCRIPTION
==========================================================
N62456-86-C-1243P001     Add Additional Flashing

FUNDS REQ'D -CONTR PROP:REQUESTED   RECEIVED    AMT($)
=================================================================
Y                                   Apr 1, 1987 $500.00

TIME(DAYS) FUNDS?   X NO.      GOVT EST($) NTP DATE
=================================================================
         5 Y                   $335.03

CHANGE ORDER:NEG DATE     DATE TO OICC C/O NO.  AMT($)
======================================================================

TIME(DAYS) DATE ISS'D  REMARKS
=======================================================
```

The Prospective Change Order after entry of the government estimate developed in the previous spreadsheet.

Figure 5.10 Example Project Prospective Change Order Log #2

-C- F C
Ser /

From: ROICC Northwest Area (Code 70)
To: OICC

Subj: PROPOSED CHANGE ORDER NO.P01 TO CONSTRUCTION CONTRACT
N62456-86-C-1243, Reroof Gym

Encl: (1) Recommended Wording for Modification
(2) Negotiation Record of 4-15-87
(3) Contractor's Estimate of 4-1-87
(4) Negotiated Settlement
(5) Funding Document OA No. RCP No.

1. A change order is recommended under Clause(s) 17 of the General Provisions of subject contract in the additive amount of $335.03 with 5day(s) time extension in accordance with enclosures (1) through (3), worded as shown on enclosure (1).

2. The change order when issued supersedes the following Notices to Proceed:

ROICC letter serial 11100-87-86 of 4-12-87 for $400.00
of for

3. The Reason Code for this change is: UNFO

4. Reason for the change: Unforeseen condition, existing flashing deteriorated

Approved/Disapproved:

LT I. AM ABLE, CEC,USN

OICC

ROICC Concurrence

bcc:
WESTNAVFACENGCOM (Code 022.11)

Figure 5.11 Change Order Proposal Form (page 1 of 3)

SUGGESTED WORDING FOR PROPOSED CHANGE (P/C)P01, CONTRACT
N62456-86-C-1243

"As a change to the subject contract you are hereby directed to provide all labor, approved material, and equipment necessary to accomplish the work listed below:

Accomplish additional flashing work as an in-scope change to the contract with an extension of time due to unforeseen conditions.

"The contract price is **additive $335.03** and the contract time **is increased** 5 days."

increased $335.03

"The foregoing is agreed to as constituting full and complete equitable adjustment in full accord with General Provisions Clause, EQUITABLE ADJUSTMENT: WAIVER AND RELEASE OF CLAIMS (7-76)."

Figure 5.11 Change Order Proposal Form (page 2 of 3)

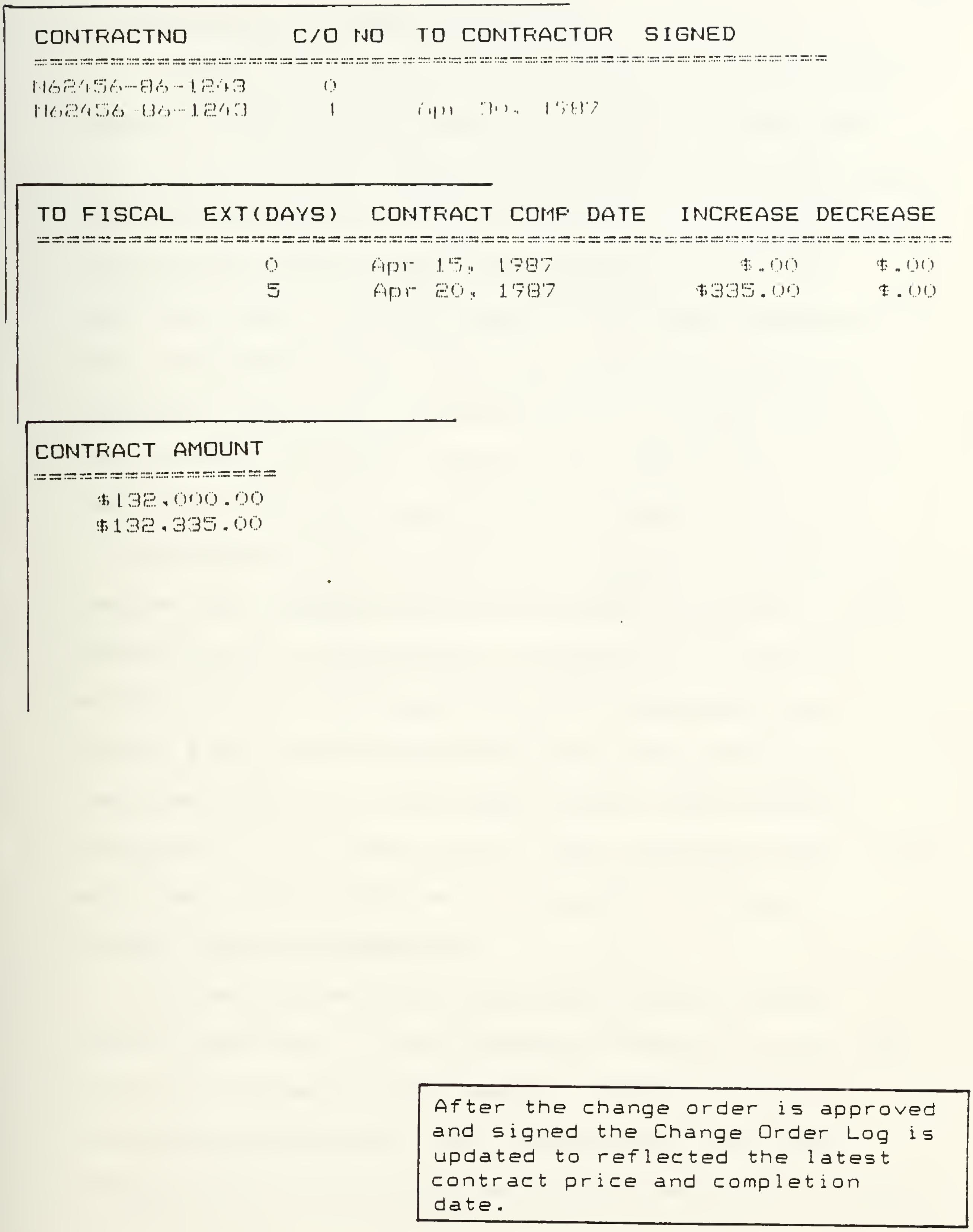
NEGOTIATION RECORD FOR PROPOSED CHANGE (P/C)P01, CONTRACT N62456-86-C-1243

Date and Place: 15 April 1987 ROICC Office, Silverdale
For the Government: Lt. I. Am Able,CEC, USN
For the Contractor: Jack Jones, Owner
Contractor's Proposal: $500.00 and 5 days time extension (Encl(3))
Government Estimate: $335.03 and 5 days time extension (Encl(4))
Negotiated Settlement: $335.00 and 5 days time extension (Encl ( ))

SUMMARY OF NEGOTIATIONS:
Contractor agrees to Government Estimate rounded to the nearest dollar.

The Change Order Proposal Form represents a standard form letter used to transmit all the estimates and negotiation results along with the recommended wording to the OICC for approval.

Figure 5.11 Change Order Proposal Form (page 3 of 3)



```
CONTRACTNO          C/O NO  TO CONTRACTOR  SIGNED
=====================================================
N62456-86-1243        0
N62456-86-1243        1        Apr 30, 1987
```

```
TO FISCAL  EXT(DAYS)  CONTRACT COMP DATE  INCREASE DECREASE
============================================================
                0     Apr 15, 1987           $.00      $.00
                5     Apr 20, 1987        $335.00      $.00
```

```
CONTRACT AMOUNT
================
    $132,000.00
    $132,335.00
```

After the change order is approved and signed the Change Order Log is updated to reflected the latest contract price and completion date.

Figure 5.12 Example Project Change Order Log

Reflections Upon System Development

In retrospect, the prototype system is a good overall example of the type of system which can be created with integrated software. Appropriate approaches to each type of file were used and the macros served as an effective means of tying the files together and reduced the level of knowledge required by the user. If the task was undertaken again, the author would not change the files used in the system nor the overall structure of the program. If more time had been available, however, the system may have been developed further as noted in the next section.

By beginning with a working knowledge of Framework II and the FRED language the programming and testing of the system required approximately 60 hours over a ten-week period. Further development by field personnel would require a similar knowledge level and time investment. There was a learning curve experienced in the system's development, i.e., after initial menu and macro setup, later additions to the system were much easier to develop.

Further System Enhancements

Future enhancements to the system could include features such as: a "bomb-proofing" feature to check each data entry for appropriate range or format, a loading program to automatically load the program files when Framework II is booted, and additional prompts to fill each

cell of the databases. If the system were to be functionally expanded, consideration should be given to additional tasks outlined in Table 3.1.

An additional recommended refinement, which was not included in the prototype due to time constraints, is the referencing of cells between files to facilitate the automatic transfer of information from one file to another. This would allow certain data to be entered only once, an ideal situation as discussed in chapter 3.

The time and effort involved for these refinements could be estimated as approximately two or three weeks of full-time attention. The level of knowledge needed by the programmer will be extensive as mentioned previously.

CHAPTER 6

FEASIBILITY OF IMPLEMENTING COMPUTERS BY A NAVY CONTRACTS ADMINISTRATOR

Chapters 3 through 5 describe the concept and preliminary design for an application program to support an AROICC in routine contract administration. This leaves the question, "Can such a system be successfully implemented and profitably used by an AROICC?" The following discussion examines the question from technical, functional or operational, institutional and financial perspectives.

Technical Feasibility

Technical feasibility addresses the question of whether the computer resources exist to implement a functional system. From the prototype presented in chapter 5, it has been proven that the software and hardware are available to create and support a Contract Administrator's Electronic Notebook. The other dimension to this question is whether computers have enough RAM memory to handle an operational system. In Framework II, all data files are in memory when they are used; they are not accessed on disk. Currently, the empty application program with Framework II and DOS requires 425K RAM; loaded with data representing 15 contracts, the program requires 530K RAM. For a 640K machine, this leaves 110K of available memory for additional

data records and macro application programs. Extrapolating for double the number of files in the prototype; an estimate of the required memory for a full system is 640K.

If the prototype is expanded to encompass more functions of the AROICC and more project records, the system will eventually encounter limitations in the size of files that can be maintained. This could require that separate databases would be maintained for individual or groups of contracts or that separate systems would be maintained for different types of information. In either case, this could significantly reduce the flexibility of using and exchanging information between data files. The separation of the files by file types is recommended as opposed to the separation by contract since this would still allow sorting and comparison of similar data.

With the recent introduction of the new IBM Personal System 2 type of PC, memory restriction problems effectively disappear. This new generation of machines has RAM capacities of several megabytes vice the current restriction of 640K.

Functional or Operational Feasibility

If the Notebook is technically feasible, will the system meet the functional or operational needs of the AROICC? If the program is expanded as recommended in chapter 5, the author estimates that the program would cover up to 95% of AROICCs' typical administrative duties which occupy at least 50% of their time. But if the system is

implemented, will it be used by the AROICC? "The expense of an unused system is never zero and the benefits of an unused system are always zero" [Gildersleeve, 1978, 215]. Many factors can affect the level of use a system receives, including: difficulty in learning or using, users reluctance to learn new programs, and incompatibility with existing systems. These factors will vary with each implementation.

The prototype system is not difficult to learn or use but a certain level of Framework II knowledge is required. The user will have to invest approximately eight hours learning the basics of Framework II in order to be comfortable using the Electronic Notebook. Documentation is essential to increasing the ease of use and reducing frustration. The prototype system documentation provides examples and instructions for each operation and are an illustration of the type of documentation required for any expansion of the system.

The reluctance of users to learn new software is a psychological barrier that is frequently encountered. Once users have "suffered" through learning to use one system or program there is great reluctance to go through the process again. To overcome this aversion the user must be shown there is greater benefit to be gained and the process must be made as "painless" as possible. Management support is

essential in establishing the value and benefit of a system, and a well-organized program with good documentation can make the process less painful.

Economic Feasibility

The economic feasibility of an AROICC Electronic Notebook is viewed from the perspective of the benefit-cost ratio of implementing and using the system.

Costs. Costs in implementing a system include initial investments in hardware and software, and staff time costs in training an AROICC. Ongoing operating system costs include maintenance and supplies. Table 6.1 estimates the costs for one system.

Table 6.1

System Costs Per AROICC

Description	Initial Cost	Annual Cost
PC with Printer	$3,000	
Framework II Software	$400	
Training	$250	
Reduced Productivity While Training	$1,250	
Supplies	$50	$100
Maintenance		$100
Totals	$4,950	$200

Hardware and software capital costs are dropping steadily as new technology reaches the market and substantial discounts can be obtained through open General Services Administration's (GSA) contracts. The training estimate is based upon two days' salary, for self-instruction (primarily), for an AROICC. Indirect costs associated with this training include reduced productivity while learning the system. This could amount to as much as two weeks lost time.

Annual cost estimates are based on routine maintenance for hardware performed by contract, upgrades and/or license agreements for software and miscellaneous supplies such as disks, ribbons and paper. In addition, frequent turnover of AROICC personnel due to military transfer will likely necessitate annual training of new personnel, this is not indicated in the table.

Benefits. Projected benefits of the system include: improved communications with the contractor, improved AROICC productivity allowing for an increased contract load per AROICC, and reduced claims and change orders. Table 6.2 outlines an estimate of the annual savings associated with one system.

Actually, the benefits are all interrelated; if AROICCs' productivity is improved they can administer more contracts, more effectively. This means they will have more time to improve communications with the contractor and improved communications is almost a guarantee of reduced

construction claims. The only direct measure of these benefits that can be calculated is reduced claims and change orders. Assuming that an average change order costs $1,500 and that by utilizing the system an AROICC can eliminate one change per contract on 20 contracts a year this would total to as much as $30,000 per year. It is also conservatively estimated that AROICC productivity can be improved to permit each AROICC to handle one more contract a year--which would represent an additional 5% or $1,500 savings a year. These numbers were verified by current AROICCs as being a reasonable assumption.

Table 6.2

System Benefits Per AROICC

Description	**Annual Savings**
Improved Productivity	$1,500
Reduced Claims and Change Orders	$30,000
Improved Communications with Contractor	$2,000
Total	$33,500

In conclusion, projected annual savings from use of the system is in the order of $33,500. Implementation costs are projected to be $4,950. The benefit to cost ratio for implementation is 6.8 or implementation costs would be paid back in 2 months. Annual operating costs are negligible so

ongoing applications would realize an annual savings of approximately $30,000 or the annual salary of a typical AROICC.

Institutional Feasibility

Institutional feasibility primarily addresses the issue of management support or backing for a system. Management must require or encourage the use of the system to make it a viable venture and allow time for training, since the AROICC would be required to learn the basic tutorial features of Framework II and the application program.

Proper planning for the initial installation and training at each field office is essential since blunders at this time can have long term ill effects upon an AROICC's perception of the system. Technical support for acquisition, training and support of the system could be organized and provided by a regional EFD and/or FACSO in Port Hueneme.

Security and liability concerns for use of the system should be addressed by each office prior to installation. Since none of the material typically handled by an AROICC is classified, security is a minor problem. The worst scenario is loss or tampering of disk files. In any event, backup copies of all disks should be routinely created and work disks should be secured under lock and key.

Summary

While having a microcomputer will not ensure data will be collected, it does provide a convenient method of organizing and storing information. More importantly, once the information is stored, the computer provides a powerful and versatile tool for extracting and presenting the information needed [Hitchings, 1984].

The system is technically, functionally and economically feasible. Resources are available to expand the system to meet full operational requirements and the functions can meet up to 95% of the AROICC's typical administrative duties. The projected benefit to cost ratio is significant; time and money investments required to develop and implement the system are minuscule compared with the benefits to be gained.

Institutional feasibility is the central question. Management support is essential to the successful implementation of the system. "Out of pocket costs" are not significant. What will be critical is if management is unwilling to allot time for training and implementation.

CHAPTER 7

SUMMARY AND RECOMMENDATIONS FOR IMPLEMENTATION

Summary

The Navy contract administrator, AROICC, is responsible for overseeing the construction of multiple projects built by civilian contractors. The AROICC interacts with numerous parties in a complex organization to ensure project completion on time and within budget. A large amount of communications between parties and documentation for tracking the progress of a project are involved. Currently, practically all of the paperwork generated for documentation is tracked manually.

While computers have been adopted in many fields of construction, they have not been adopted for contract administration. However, a few farsighted private firms and public agencies are now recognizing the benefits to be gained with the microcomputer. The U.S. Army Corps of Engineers has done research in this area since 1981 and has written guidance for field offices desiring to automate and it supports a library of application programs. While these programs are not completely compatible with the Navy AROICC's functions, they can serve as a starting point for developing Navy-specific application programs.

The Navy has plans to provide microcomputers to each ROICC office, however no definitive plan for their implementation or use has been established. The ROICC, EFD,

and FACSO staffs have initiated some development of microcomputer applications for the AROICC but they appear to be independent, uncoordinated and received with low priority. Within the Navy, there is controversy over whether microcomputers are necessary for the AROICC's functions. Individual AROICC's believe the microcomputer is necessary and long overdue.

In this research, AROICC functions were modeled and a prototype, the Contract Administrator's Electronic Notebook, was developed using Framework II, an integrated business software package. The prototype consists of several template databases, spreadsheet and correspondence files of contract information which are accessed through a menu system and manipulated with macro programs. It represents the typical set of files and correspondence an AROICC would be interested in on a daily basis.

It is technically feasible to expand the prototype to a fully operational system and functionally and economically feasible to implement the system for an AROICC to use. The hardware and software resources exist to expand the system to full functional capability. Fully functional, the system is estimated to be capable of handling up to 95% of AROICCs' administrative functions which occupy about 50% of their time. The cost to implement a system is estimated to be $4,950 with a benefit to cost ratio of 6.8 or a two-month

payback. Annual savings are estimated in the order of $33,500. Actual implementation of a system, however, hinges on Navy management support.

Recommendations

The ROICC office desiring automation needs an organized plan to ensure success. Recommended steps in such a plan are outlined below.

(1) In order to implement a Contract Administrator's Electronic Notebook for the AROICC, the ROICC office must first establish a commitment to test implement the system, including budgeting for and acquiring hardware and software for one or two AROICC's positions. An initial Electronic Notebook can be based upon the prototype presented in this report. It is recommended that Framework II be acquired since it has proven to be suitable in the prototype. Any full memory IBM compatible computer and printer, usable with Framework II, will suffice for an initial system.

(2) Next, a civilian staff member of the ROICC office should be trained in use of the system to serve as the "resident expert" for training and technical development of the system. The "expert" would have the responsibility to train military officers and civilian AROICCs as well as to adapt and expand the system to meet particular office needs. A civilian is preferred in this position due to the turnover of military personnel. Additional help may be available from the

EFDs and FACSO, if requested. They can provide some software training and may be willing to develop a specific application.

(3) The next step is planning phase-in of the system. A systematic approach must be taken to train AROICCs and then allow them to use the system. With the constant influx of new people in a ROICC office, it may be best to train new AROICCs as they arrive on the job and allow them to implement the system on new contracts as they are awarded while letting ongoing jobs remain in the manual form. Later, if test use proves successful, current AROICCs could be trained and ongoing project files can be automated.

(4) After test use of the Electronic Notebook the system should be re-evaluated and further automation of the AROICC's functions should be considered. It is important to recognize that developing successful computer support for the AROICC likely will be a "trial and error" process and test use will be influenced by the personal management style of the AROICC staff.

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APPENDIX A

GLOSSARY OF TERMS AND ACRONYMS

Alphanumeric- A mixture of characters which can be numbers, letters or special characters.

Application Software- This is a piece of Software that performs some real-world job, as opposed to system software, which is concerned with internal computer functions. A word processor or the Electronic Notebook are examples of application software.

AROICC- Assistant Resident Officer in Charge of Construction. A Navy construction contract administrator.

ASCII- Acronym for American Standard Code for Information Interchange. This is a standard code for representing letters, numbers, punctuation marks, and other symbols, plus a few extra codes for control purposes.

CECOS- Naval School Civil Engineer Corps Officers, Port Hueneme, CA.

CERL- U.S. Army Corps of Engineers' Construction Engineering Research Laboratory, Champaign, ILL.

CMS- Construction Management System. A main frame program used to transfer data between the ROICC office and EFD.

Data- Anything stored in or produced by a computer which is not a program. Data processing is simply the carrying out of some sort of operation (sorting, collating, calculating, for example) on data in a computer.

Database- A store of data arranged in an ordered way to allow it to be retrieved easily.

Disk or 'Floppy' Disk- A flat magnetic disk on which programs and data may be stored and retrieved quickly.

DOD- Department of Defense.

DOS- Disk Operating System, the software program which supervises the running of application programs and controls the operations of the various input and output devices.

EFD- Engineering Field Division, U.S. Navy, Naval Facilities Engineering Command. A regional headquarters.

FACSO- Facilities Support Office, Port Hueneme, CA. A Navy R&D office responsible for supporting the Civil Engineer Corps.

Graphics- The overall term meaning the appearance of pictures or diagrams on the screen as opposed to letters and numbers.

Hard Copy- The output printed out by the computer on paper.

Interactive- Generally, this term refers to the facility for the user to input information on demand from the computer and for the computer to respond immediately to requests or commands from the user.

Macro- A user-defined program activated by a coded key combination. They are used to replace repetitive and lengthy key stroke operations.

Mailmerge- The Framework II function that allows data stored in a database to be "merged" with a blank form letter to produce repetitive correspondence.

Menu- A main selection of possible tasks presented to the user on the screen while a program is running. The user selects from the menu by typing a number or letter corresponding to the action or operation desired.

Menu-Driven Program- Programs which present the operators with a list of choices at any particular time and these are displayed on the screen to choose from.

Microcomputer- A small computer based around a microprocessor chip. The term microcomputer is synonymous with "personal computer", meaning a computer whose resources are available to one user only. Personal computers range from the very basic to systems able to service many users.

Military Construction- As used in this report, refers to all publicly funded projects built by the branches of the Department of Defense.

Modem- A device that allows computers to communicate through the normal telephone system.

NAVFAC- Naval Facilities Engineering Command, the headquarters responsible for all maintenance and construction of shore facilities.

Outline- In Framework II, the ability to organize frames or thoughts the way a written outline is used with main ideas on top and subsections stored at lower levels.

PC- see microcomputer.

Program- A list of instructions that tell the computer what to do and in what order.

RAM- Stands for Random Access Memory. This is where the computer keeps the programs it is currently using and where any information required or produced by the program is stored until the computer either needs it or it is instructed to move it elsewhere.

ROICC- Resident Officer in Charge of Construction, head of a local Navy contracts office.

Software- An alternative name for computer programs.

Spreadsheet- An electronic version of ledger consisting of rows and columns. This application manipulates numeric repetitive calculations.

User Friendly- Jargon to denote a system that is easy to use by somebody who has no background in the use of computers.

Wordprocessing- The use of a computer, together with special software, to store and manipulate text.

APPENDIX B

USER'S GUIDE TO THE APPLICATION SYSTEM

Application Specification

Functional Definition

This Framework II application is necessary to demonstrate the ability of off-the-shelf integrated business software to aid a Navy Assistant Resident Officer in Charge of Construction (AROICC) in the performance of typical contract administration duties.

Assumptions and Details

The application is intended for use on two levels:

(1) the AROICC, a junior military officer or civilian equivalent, with limited microcomputer experience and basic tutorial introductory experience with the Framework II software;

(2) the AROICC with significant experience in Framework II usage and applications.

On the first level, the program should be menu-driven and self-explanatory to the uninitiated user after reading the documentation and performing an example exercise. On the second level, the user should be able to bypass the menu-system, if desired, and access data files directly. For both levels, it will be assumed that the user is familiar with the typical manual methods of contract administration, reporting forms used and common abbreviations and acronyms.

Required features of the application's operations include inputs of: basic contract data (contract number, contractor, designer, inspector, phone numbers, addresses, etc.), submittal information, correspondence information and tracking data, change orders (proposed and completed), as well as estimates and justification information required for change orders. The data input will be both alphabetic and numeric.

Computations will be required to extend the change order estimate and reflect the estimate amount in the proposed change order database and for calculating the new contract price and time after final change orders are approved.

Outputs from the application will include reports of contract data, submittal status, change orders approved, change orders pending, correspondence status, as well as completed request for change order memorandums with government estimate forms. The reports will have sort and filter features to allow reports on all contracts or any subset thereof based on contract number, contractor's name, key dates or action codes.

Framework II elements of databases, spreadsheets, wordprocessing, and macros will be used to create an integrated menu-driven system which will allow input, editing or deletion of contract information, computations for change order estimates and generation of management reports and change order requests.

The application has the capability for expansion to include other aspects of the AROICC's job or generation of special reports desired by a particular office. The documentation of the macros and application should be clear enough to allow the experienced Framework II user to make these adaptations and expansions.

Computer hardware and software required to utilize this application will include: an IBM or compatible microcomputer with a minimum of 640K RAM and two floppy disk drives or one floppy disk drive and one hard disk drive, DOS 2.1 (or later version), and the Framework II software.

Once completed, the application should be tested with hypothetical data entries and loaded to determine the maximum size files which can be stored. Also, this test should look for possible entry "bugs" and "bombing" problems. After this, and AROICC unfamiliar with the system should test the system with the "User Guide" to determine if:

(1) the documentation is adequate,
(2) the application is worthwhile, and
(3) if there are "bugs" still undiscovered.

Introductory Documentation

Introduction

This application program is called the "Contract Administrator's Notebook" and is based on the Framework II integrated business software program. It uses the FRED language inside Framework II to manipulate databases, spreadsheets and text files of contract information that a Navy contract administrator (AROICC) uses daily.

Principal features of the application (and reference forms) include:

- Job Records:
  - Contract Record Card
    - (based on 12ND WESTDIV 4330/56 (4-78))
  - Job Correspondence Log
  - Submittal Status log
    - (based on 12ND WESTDIV 4355/6 (rev7-75))
  - Prospective Change Order Log
    - (based on 11ND WESTDIV 4330/17B (5-79))
  - Official Change Order Log
- Estimates:
  - Change Order Estimate
    - (based on NAVFAC 4330/43 (6-82))
- Correspondence:
  - Change Order Proposal Form

These features were initially incorporated due to the high frequency of use and large amount of data involved.

Example

An example of the program's usage centers on the process of receiving a new contract to administer and the subsequent documents and correspondence leading up to a contractor request for change order and finally the preparation, negotiation and issuance of the change order.

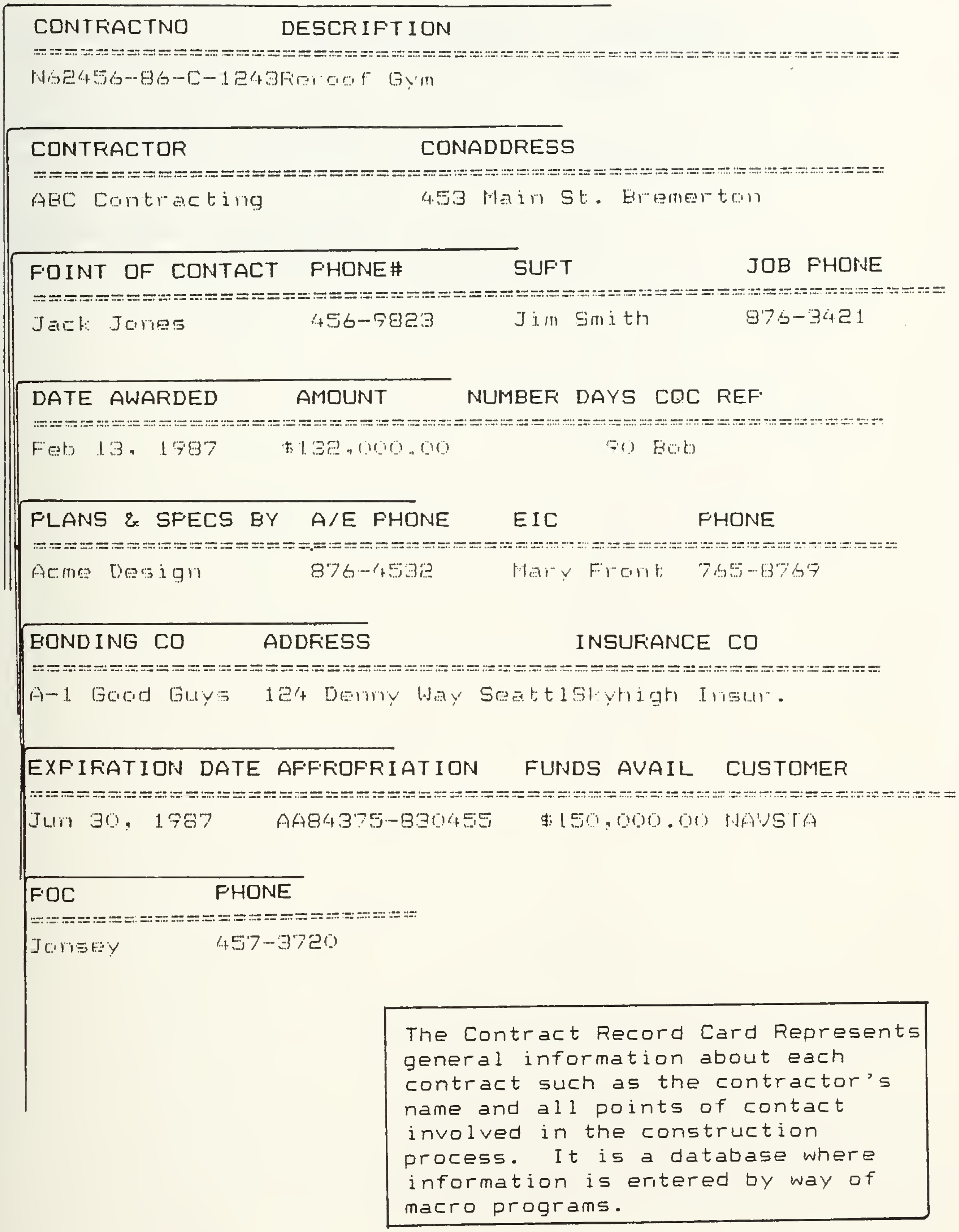
Functional Scenarios: -Electronic Notebook Operation

1. New contract assigned to AROICC:
   - -Enter contractor and award data into **Contract Record Card** (See Figure B.1.)
2. Schedule Preconstruction conference:
   - -Enter outgoing notice in **Correspondence Log** (See Figure B.2.)
3. Submittal log received from contractor:
   - -Enter submittal requirements in **Submittal Status Log** after confirming requirements are complete and dates are reasonable (See Figure B.3.)
   - -Enter transmittal in **Correspondence Log** (See Figure B.4.)
4. Request for change order received from contractor:
   - -Enter proposed change description and number in **Prospective Change Order Log** (See Figure B.5.)
   - -Search **Correspondence Log** for any other entries under the same topic (See Figure B.6.)

- Enter request letter in **Correspondence Log** (See Figure B.7.)
- Generate government estimate on **Change Order Estimate** form (See Figure B.8.)
- Enter estimate value in **Prospective Change Order Log** (See Figure B.9.)
- Print **Change Order Proposal Form** with information from **Prospective Change Order Log, Estimate Form,** and **Contract Record Card** (See Figure B.10.)

5. Change order approved:
    - Enter change order in **Change Order Log** to update value and time for contract (See Figure B.11.)

This example suggests the type of documentation and information the AROICC is concerned with in the change order process. Each piece of incoming and outgoing correspondence must be tracked, changes in contract time and costs must be accounted for, and records must be readily available for cross-referencing and sorting based upon selected criteria.



```
CONTRACTNO        DESCRIPTION
==========================================================================
N62456-86-C-1243Reroof Gym

CONTRACTOR                       CONADDRESS
==========================================================================
ABC Contracting                  453 Main St. Bremerton

POINT OF CONTACT   PHONE#        SUPT               JOB PHONE
==========================================================================
Jack Jones         456-9823      Jim Smith          876-3421

DATE AWARDED      AMOUNT       NUMBER DAYS CQC REF
==========================================================================
Feb 13, 1987     $132,000.00           90 Bob

PLANS & SPECS BY   A/E PHONE     EIC          PHONE
==========================================================================
Acme Design        876-4532      Mary Front   765-8769

BONDING CO      ADDRESS                   INSURANCE CO
==========================================================================
A-1 Good Guys   124 Denny Way SeattlSkyhigh Insur.

EXPIRATION DATE APPROPRIATION    FUNDS AVAIL   CUSTOMER
==========================================================================
Jun 30, 1987    AA84375-830455   $150,000.00 NAVSTA

POC             PHONE
===============================
Jonsey          457-3720
```

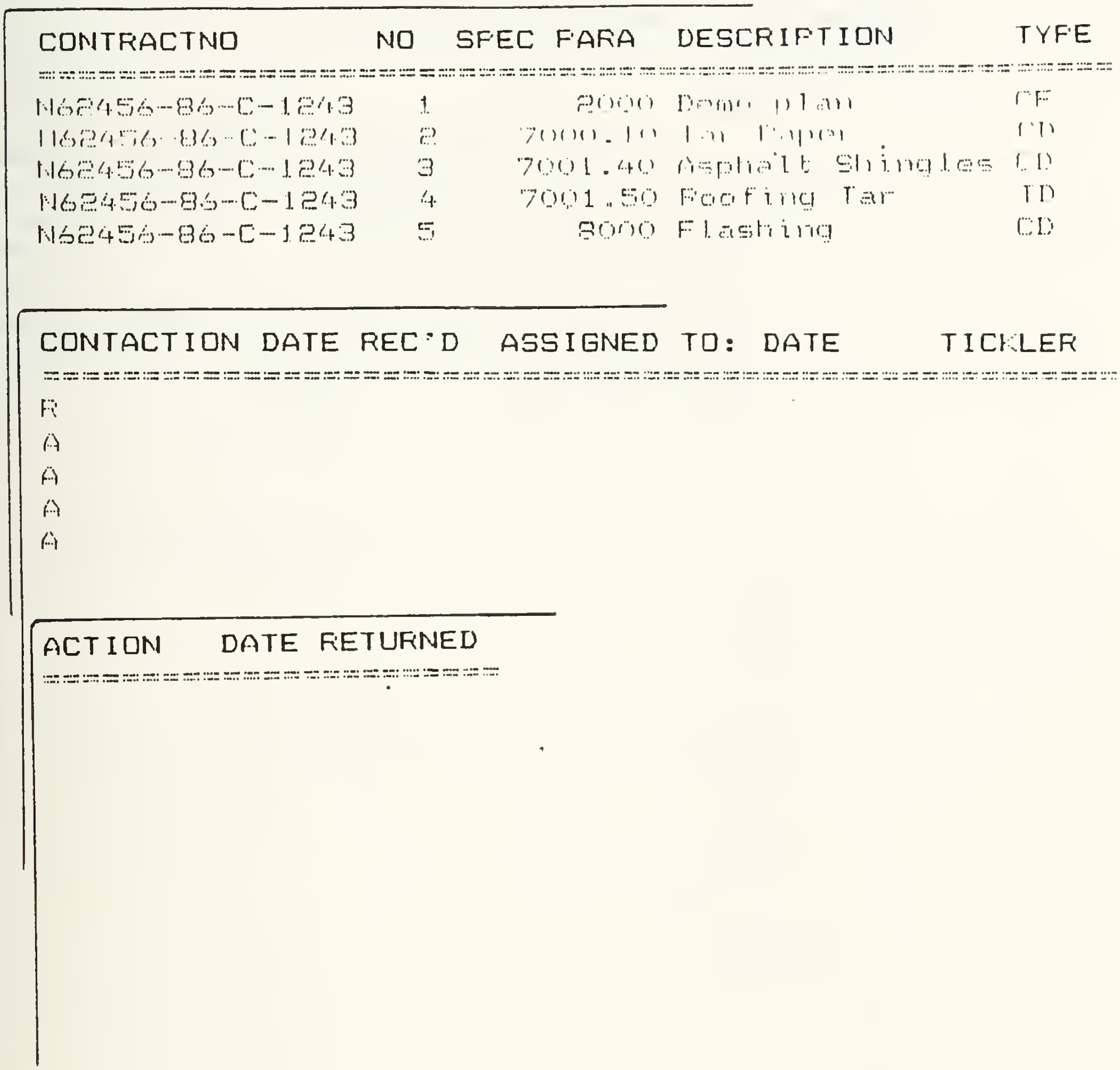
The Contract Record Card Represents general information about each contract such as the contractor's name and all points of contact involved in the construction process. It is a database where information is entered by way of macro programs.

Figure B.1 Example Project Contract Record Card

```
CONTRACTNO            INCOMING/OUTGOING  ORIGINATOR
=================================================================
N62456-86-C-1243              O          ROICC

DATE SENT/REC'D  SUBJECT
=======================================================
Feb 20, 1987     Preconstruction mtg. notice

ACTION CODE   RESPONSIBLE  TICKLER DATE
==============================================
N             AROICC       Feb 27, 1987
```

The Job Correspondence Log is a status log of all incoming and outgoing correspondence with action codes and tickler dates for followup indicated. Information is entered into the database by way of macro programs.

Figure B.2 Example Project Job Correspondence Log #1



```
CONTRACTNO           NO   SFEC FARA  DESCRIFTION        TYFE
==================================================================
N62456-86-C-1243     1         2000  Demo plan          CF
N62456-86-C-1243     2      7000.10  Tar Paper          CD
N62456-86-C-1243     3      7001.40  Asphalt Shingles   CD
N62456-86-C-1243     4      7001.50  Roofing Tar        TD
N62456-86-C-1243     5         8000  Flashing           CD

CONTACTION DATE REC'D  ASSIGNED TO: DATE      TICKLER
==================================================================
R
A
A
A
A

ACTION   DATE RETURNED
============================
```

The Submittal Status Log represents a list of required submittals for each contract and the status of each as they are received from the contractor. Input is accomplished by way of macro programs.

Figure B.3 Example Project Submittal Log

```
CONTRACTNO             INCOMING/OUTGOING  ORIGINATOR
=============================================================
N62456-86-C-1243               O          ROICC
N62456-86-C-1243               I          ABC Contracting
```

```
DATE SENT/REC'D  SUBJECT
==============================================
Feb 20, 1987     Preconstruction mtg. notice
Mar 10, 1987     Submittal Log
```

```
ACTION CODE   RESPONSIBLE   TICKLER DATE
=======================================
N             AROICC        Feb 27, 1987
A             AROICC        Mar 17, 1987
```

The Job Correspondence Log after entry of the submittal log transmittal.

Figure B.4 Example Project Job Correspondence Log #2

```
CONTRACT NO.    FCO NO.  DESCRIPTION
========================================================================
N62456-86-C-1243P001      Add Additional Flashing


FUNDS REQ'D -CONTR PROP:REQUESTED   RECEIVED    AMT($)
==============================================================================
Y                                   Apr 1, 1987 $500.00


TIME(DAYS) FUNDS?   X NO.      GOVT EST($) NTP DATE
==============================================================================
         5 Y


CHANGE ORDER:NEG DATE      DATE TO OICC C/O NO.  AMT($)
==================================================================================


TIME(DAYS) DATE ISS'D  REMARKS
============================================================
```

The Prospective Change Order Log represents a status log of all pending change orders. It tracks the status from initiation by the AROICC or contractor until negotiation and official signature of the change order documents.

Figure B.5 Example Project Prospective Change Order Log #1

```
CONTRACTNO         INCOMING/OUTGOING  ORIGINATOR
==========================================================


DATE SENT/REC'D  SUBJECT
===============================================


ACTION CODE   RESPONSIBLE  TICKLER DATE
========================================
```

This Job Correspondence Log represents all records containing the word flashing in the subject field, zero. It is the result of filtering the database.

Figure B.6 Example Project Correspondence Log Filtered on Subject=*flashing*

```
CONTRACTNO                 INCOMING/OUTGOING   ORIGINATOR
=====================================================================
N62456-86-C-1243                  O            ROICC
N62456-86-C-1243                  I            ABC Contracting
N62456-86-C-1243                  I            ABC Contracting
```

```
DATE SENT/REC'D   SUBJECT
=====================================================
Feb 20, 1987      Preconstruction mtg. notice
Mar 10, 1987      Submittal Log
Apr 1, 1987       C/O request-flashing
```

```
ACTION CODE    RESPONSIBLE   TICKLER DATE
==============================================
N              AROICC        Feb 27, 1987
A              AROICC        Mar 17, 1987
A              AROICC        Apr 8, 1987
```

Job Correspondence Log after receipt of request for change order.

Figure B.7 Example Project Job Correspondence Log #3

```
DATE:                                                  Apr 5, 1987
CONTRACT NUMBER:                                       N62456-86-1243
CONTRACT TITLE:                                        Reroof Gym
CHANGE DESCRIPTION:
         Add additional flashing to roof

************************************************************
_____________________PRIME CONTRACTOR WORK________________
1. LABOR                                                    100
2. FRINGE BENEFITS                                           43
3. MATERIAL                                                  50
4. RENTAL EQUIPMENT                                           0
5. OPERATING & MINOR MAINT. FOR OWNED EQUIP.                  0
6. SUBTOTAL (1+2+3+4+5)                                     193
7. FIELD OVERHEAD (   % OF LINE 6)                        19.30
8. LIABILITY & COMP. INSURANCE (   % OF LINE 1)               1
9. SUBTOTAL (6+7+8)                                      213.30
10. HOME OFFICE OVERHEAD (   % OF LINE 9)                  6.40
11. EQUIPMENT OWNERSHIP EXPENSE                               0
12. SOCIAL SECURITY & UNEMPLOYMENT INS. ( % OF LINE 1)     7.50
13. SUBTOTAL (9+10+11+12)                                227.20
____________________SUBCONTRACTORS WORK___________________
14. LABOR                                                    50
15. FRINGE BENEFITS                                          20
16. MATERIAL                                                  0
17. RENTAL EQUIPMENT                                          0
18. OPERATING & MINOR MAINT. FOR OWNED EQUIP.                 0
19. SUBTOTAL (14+15+16+17+18)                                70
20. FIELD OVERHEAD (  % OF LINE 19)                        2.10
21. LIABILITY & COMP. INSURANCE (  % OF LINE 14)            .50
22. SUBTOTAL (19+20+21)                                   72.60
23. HOME OFFICE OVERHEAD (  % OF LINE 22)                  2.18
24. EQUIPMENT OWNERSHIP EXPENSE                               0
25. SOCIAL SECURITY & UNEMPLOYMENT INS. (% OF LINE 14)     3.75
26. SUBTOTAL (22+23+24+25)                                78.53
27. PROFIT (   % OF LINE 26)                               4.71
28. SUBTOTAL (26+27)                                      83.24
________________________SUMMARY___________________________
29. PRIME CONTRACTOR'S WORK                              227.20
30. SUBCONTRACTOR'S WORK                                  83.24
31. PRIME CONT. OVERHEAD ON SUBS WORK (  % OF LINE 30)     2.50
32. SUBTOTAL (29+30+31)                                  312.94
33. PRIME CONTRACTOR'S PROFIT (   % OF LINE 32)           18.78
34. SUBTOTAL (32+33)                                     331.71
35. PRIME CONTRACTOR BOND PREMIUM (   % OF LINE 34)        3.32
36. TOTAL COST (34+35)                                   335.03
************************************************************
ESTIMATED TIME EXTENSION AND JUSTIFICATION:
Additional flashing required to replace deteriorated existing.
Not shown on plans.  Unforeseen.
```

The Change Order Estimate form is an extension of the government cost estimate based on user input percentages for all variables (the lines where a % sign is indicated) and entry of direct labor, material and equipment costs.

Figure B.8 Example Project Change Order Estimate

```
CONTRACT NO.    PCO NO.  DESCRIPTION
==========================================================
N62456-86-C-1243P001      Add Additional Flashing


FUNDS REQ'D -CONTR PROP:REQUESTED   RECEIVED    AMT($)
================================================================
Y                                   Apr 1, 1987 $500.00


TIME(DAYS) FUNDS?   X NO.      GOVT EST($) NTP DATE
================================================================
         5 Y                  $335.03


CHANGE ORDER:NEG DATE      DATE TO OICC C/O NO.  AMT($)
====================================================================


TIME(DAYS) DATE ISS'D  REMARKS
========================================================
```

The Prospective Change Order after entry of the government estimate developed in the previous spreadsheet.

Figure B.9 Example Project Prospective Change Order Log #2

[illegible]
Ser

From: ROICC Northwest Area (Code 70)
To: OICC

Subj: PROPOSED CHANGE ORDER NO.P01 TO CONSTRUCTION CONTRACT
N62456-86-C-1243, Reroof Gym

Encl: (1) Recommended Wording for Modification
(2) Negotiation Record of 4-15-87
(3) Contractor's Estimate of 4-1-87
(4) Negotiated Settlement
(5) Funding Document OA No. RCP No.

1. A change order is recommended under Clause(s) 17 of the General Provisions of subject contract in the additive amount of $335.03 with 5day(s) time extension in accordance with enclosures (1) through (3), worded as shown on enclosure (1).

2. The change order when issued supersedes the following Notices to Proceed:

ROICC letter serial 11100-87-86 of 4-12-87 for $400.00
of for

3. The Reason Code for this change is: UNFO

4. Reason for the change: Unforeseen condition, existing flashing deteriorated

Approved/Disapproved:

LT I. AM ABLE, CEC,USN

OICC

ROICC Concurrence

bcc:
WESTNAVFACENGCOM (Code 022.11)

Figure 8.10 Change Order Proposal Form (page 1 of 3)

SUGGESTED WORDING FOR PROPOSED CHANGE (P/C)**P01**, CONTRACT
N62456-86-C-1243

"As a change to the subject contract you are hereby directed to provide all labor, approved material, and equipment necessary to accomplish the work listed below:

Accomplish additional flashing work as an in-scope change to the contract with an extension of time due to unforeseen conditions.

"The contract price is **additive** $335.03 and the contract time is increased 5 days."

increased $335.03

"The foregoing is agreed to as constituting full and complete equitable adjustment in full accord with General Provisions Clause, EQUITABLE ADJUSTMENT: WAIVER AND RELEASE OF CLAIMS (7-76)."

Figure B.10 Change Order Proposal Form (page 2 of 3)

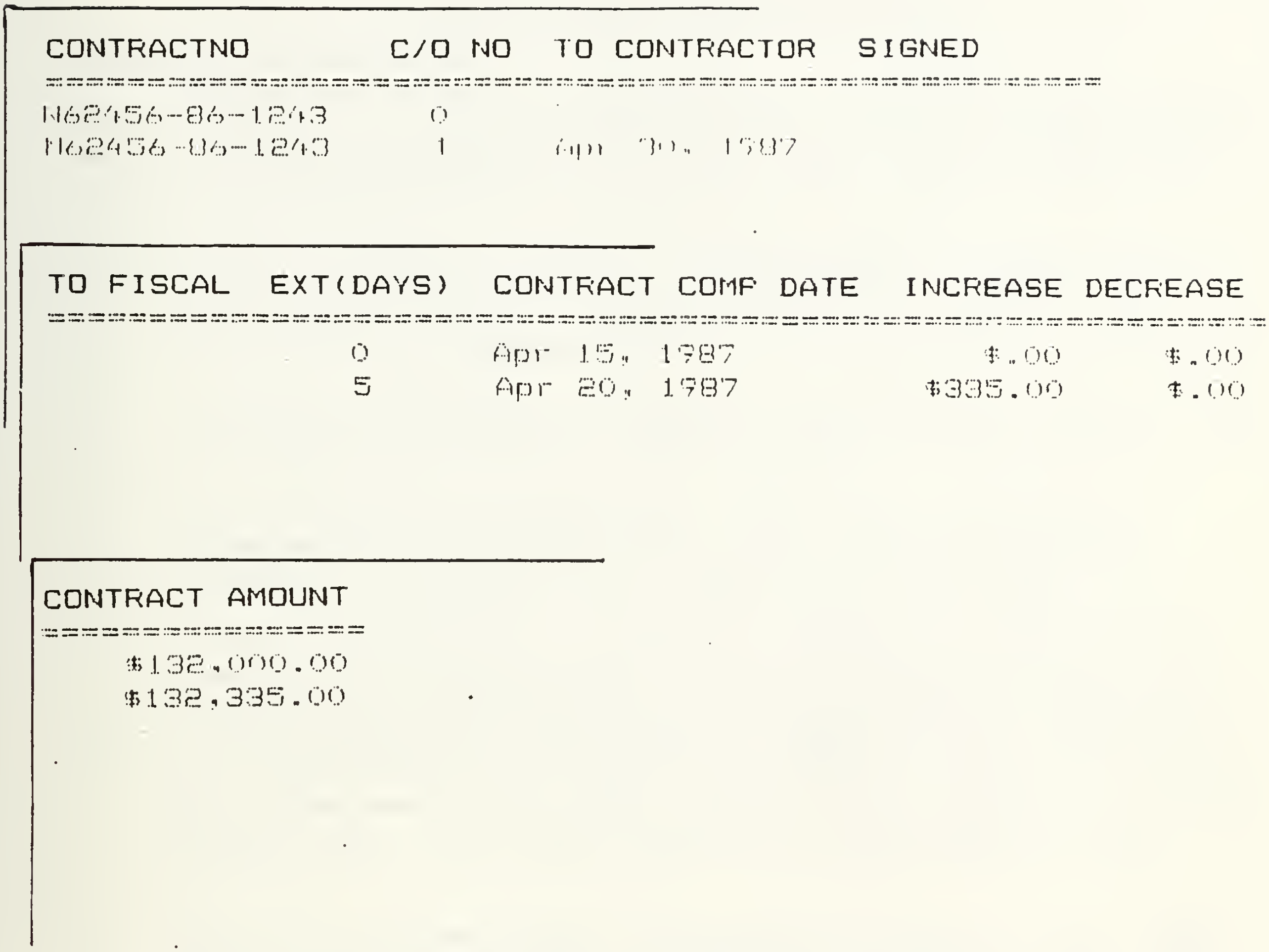
NEGOTIATION RECORD FOR PROPOSED CHANGE (P/C)F01, CONTRACT N62456-86-C-1243

Date and Place: 15 April 1987 ROICC Office, Silverdale
For the Government: Lt. I. Am Able,CEC, USN
For the Contractor: Jack Jones, Owner
Contractor's Proposal: $500.00 and 5 days time extension (Encl(3))
Government Estimate: $335.03 and 5 days time extension (Encl(4))
Negotiated Settlement: $335.00 and 5 days time extension (Encl ( ))

SUMMARY OF NEGOTIATIONS:
Contractor agrees to Government Estimate rounded to the nearest dollar.

The Change Order Proposal Form represents a standard form letter used to transmit all the estimates and negotiation results along with the recommended wording to the OICC for approval.

Figure B.10 Change Order Proposal Form (page 3 of 3)



```
CONTRACTNO          C/O NO   TO CONTRACTOR   SIGNED
=========================================================
N62456-86-1243        0
N62456-86-1243        1       Apr 30, 1987

TO FISCAL  EXT(DAYS)  CONTRACT COMP DATE   INCREASE DECREASE
=============================================================
                0      Apr 15, 1987           $.00      $.00
                5      Apr 20, 1987        $335.00      $.00

CONTRACT AMOUNT
================
    $132,000.00
    $132,335.00
```

After the change order is approved and signed the Change Order Log is updated to reflected the latest contract price and completion date.

Figure B.11 Example Project Change Order Log

Detailed User Documentation

Loading Instructions

Starting the application program requires the hardware and software outlined in the Application Specification (page 92). For a microcomputer with two floppy disk drives the loading procedure is:

1. With the computer on and the DOS system loaded, the cursor should be on **A:>** (for computers with a hard disk the default is C:>, change to A:> by typing **A:** and striking the **RETURN** key).

2. Place the Framework II system 1 disk in the **A** drive and the Application disk in the drive **B**.

3. Type **FW** and strike **RETURN.** This will load the Framework II program. In a few seconds a license agreement statement will appear on the screen.

4. Remove the Framework II system 1 disk from drive A and replace with the system 2 disk, then strike **RETURN.** This loads the remaining portion of the program. After a few seconds the Framework II desktop will appear on the screen with a row of menus along the top and a list of libraries: <A:>, <B:>, <C:>, etc. running down the right side. The cursor should be highlighting the <A:>.

5. Using the arrow keys, move the cursor down to the **<B:>** library and press **CTRL** and **RETURN** together. This sets the B drive as the default for writing all files. Without this step new files would be written on the Framework II disk or lost.

6. Press **RETURN** and the file directory for the Application Program should appear on the desktop. Inside the directory there should be three files: Contract, Documentation, and Macros_H. If any of these is missing a new copy of the disk should be obtained before proceeding.

7. Press the **DOWNLEVEL (+)** key to go inside the directory frame, then use the **ARROW** keys to highlight **Macros_H.** Press **RETURN** and the file name will appear in the lower right hand corner of the screen. Press **RETURN** again and the file will open at the top of the screen.

8. Press **SCROLL LOCK** to shuttle back inside the directory. Use **ARROW** keys to highlight **Contract**, then press **RETURN.** The file name should appear in the lower right hand corner of the screen. Press **RETURN** again to open the file.

9. Now the cursor should appear on the frame title "Contract Administrator's Notebook" and the program can begin with a single keystroke. (see below)

General Operating Instructions

The application program is set up with a series of menus to allow the user to choose the Job Records, Estimates or Correspondence options then choose the particular file to work with. Once the specific file is identified, it will appear on the screen and may be modified or printed as desired using the macro programs embedded in the application. The macros are executed using an Alt-<key> combination. A "Macros Help" file at the top of the screen is a quick reference to the operations available and the key codes. In general, the macros produce prompt lines (questions or suggestions) at the bottom of the screen to guide the user.

Figure B.12 presents the program layout in outline form. **Job Records, Estimates,** and **Correspondence** are menus containing the options listed below the title. **Macros** contains the macro programs used within this program. (These will be described later.) **Data Storage** contains the actual files where contract information is stored. Finally, **Current Selection** holds the title of the file last chosen from the menu for reference in the macro programs.

```
Job Records                      <-I
     Contract Record Card          I
     Job Correspondence Log        I
     Submittal Status Log          I
     Prospective Change Order Log  I    Menu Selections
     Official Change Order Log     I
Estimates                          I
     Change Order Estimate         I
Correspondence                     I
     Change Order Proposal Form  <-I
Macros
     Add                         <-I
     Add Another                   I
     Change                        I
     Change Continue               I
     Date                          I    Macro Programs:
     Remove                        I    those with bold
     Print                         I    first letters
     Print Selected Records        I    are main pro-
     Menu                          I    grams, others
     Quit                        <-I    are subroutines
Data Storage
     Contract Record Card Database      <-I
     Job Correspondence Log Database      I
     Submittal Status Log Database        I  Data File
     Prospective Change Order Log Database I  Storage
     Official Change Order Log Database    I
     Change Order Estimate Spreadsheet    I
     Change Order Proposal Database       I
     Change Order Proposal Form Template <-I
Current Selection                        <-   Stores
                                              the name
                                              of the
                                              last menu
                                              selection
                                              for macro
                                              use
```

Figure B.12 Framework II Outline Listing of the Contract Administrator's Electronic Notebook

The user should be familiar with a few basic key strokes before beginning the program:

1. **F5**- With the cursor on any frame title this recalculates any formulas within a frame. In the Contract Administrator's Notebook this starts the menu system.
2. **ESC**- The escape key, in general, allows the user to abort the current operation and revert to the previous screen. Within a menu, ESC quits the menu.
3. **UPLEVEL** (-)- The minus key allows the user to jump the cursor from inside a frame up to the title or frame border.
4. **DOWNLEVEL** (+)- The plus key allows the user to jump the cursor inside a frame from the title.
5. **ARROW KEYS** (<-,->,^,)- The arrow keys allow the user to maneuver within a frame's content area.
6. **F6**- This function key is labeled "extend select." It allows the user to highlight more than one work, record or file for moving, copying or deleting. When F6 is pushed, the arrow keys can be used to "extend" the length and height of the cursor to cover the area desired. RETURN stops extend select and freezes the cursor position and size until one of the arrow keys or RETURN is pushed.

To begin the Application Program, press **F5** when the cursor is on the Contract Administrator's Notebook frame title. (If this does not make sense, review the loading instructions.) The following should appear:

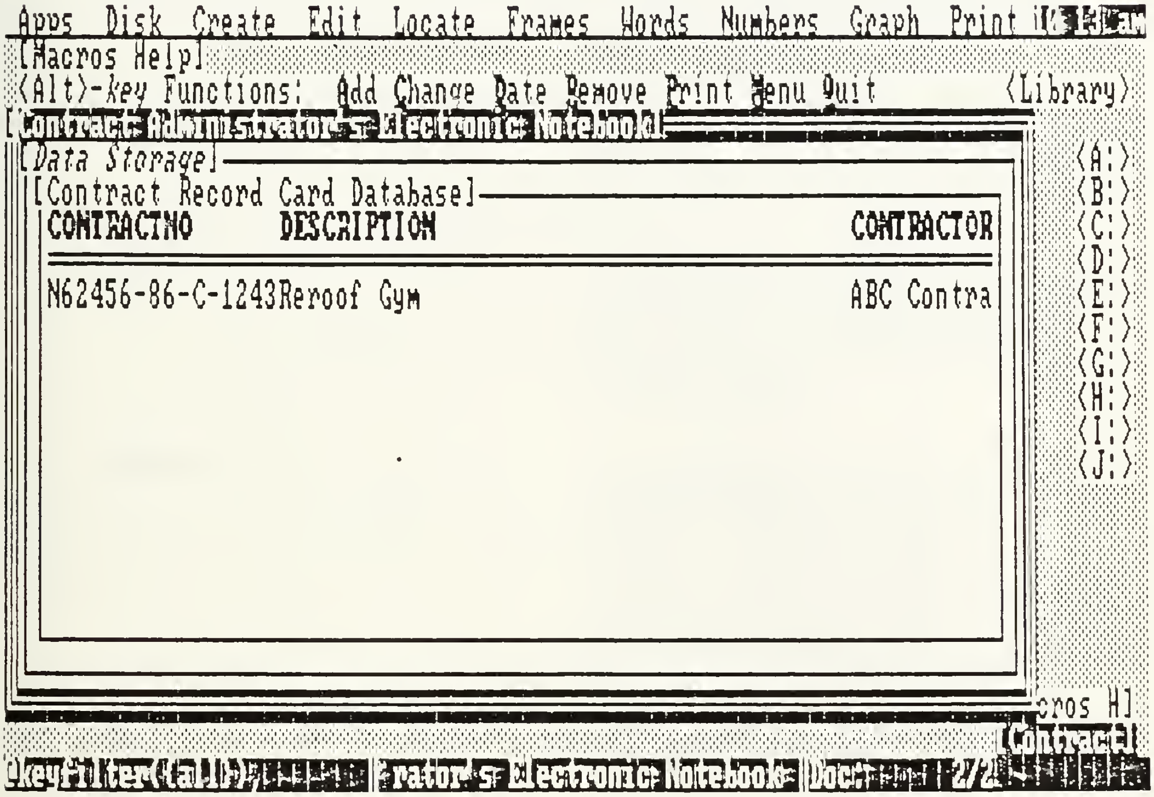
Contract Administrator's Notebook Menu:
Job Records
Estimates
Correspondence
Macros (not available)
Data Storage (not available)
Current Selection (not available)

Only the first three options are available for selection. Select from these options using the **ARROW** keys to highlight the choice and **RETURN** to execute, or just hit the first letter of the selection on the keyboard. For example typing "**J**" for Job Records will produce another menu of choices.

Job Records Menu:
Contract Record Card
Job Correspondence Log
Submittal Status Log
Prospective Change Order Log
Official Change Order Log

Again, for menu selection highlight the choice and hit **RETURN** or type the first letter. For example type "**C**" for Contract Record Card. Now the database containing the

Contract Record Card will appear on the screen and menus will disappear. The screen should look like this:


Apps Disk Create Edit Locate Frames Words Numbers Graph Print
[Macros Help]
(Alt)-key Functions: Add Change Date Remove Print Menu Quit
(Library)
[Contract Administrator's Electronic Notebook]
[Data Storage]
[Contract Record Card Database]
(A:)
(B:)
(C:)
(D:)
(E:)
(F:)
(G:)
(H:)
(I:)
(J:)
cros H]
[Contract]
keyfilter(call)
rator's Electronic Notebook
Doc
2/2

CONTRACTNO	DESCRIPTION	CONTRACTOR
N62456-86-C-1243	Reroof Gym	ABC Contra

At this point the Macros operations take over. Macros are executed by pressing the **ALT** key and the letter key underlined at the same time. Review the Macros Help frame at the top of the screen for the options available. These operation may be executed either when the cursor is inside the frame or on the title. Table B.1 list each macro and a description of its function.

Table B.1 Macros Descriptions

ALT-<key>	Description
Add	Adds an additional blank record to databases and allows the user to enter new information.
Change	Allows the user to freely edit any information inside a frame.
Date	Prompt user for year, month and day, formats the date into MMM,DD,YYY and places it inside the cell currently highlighted.
Remove	Deletes the records currently highlighted with the cursor. This should be used with care. If the cursor is on the frame title the entire file will be lost. Once deleted, records **can not** be restored!
Print	Prints the file or selected records which are highlighted.
Menu	Returns the user to the main menu.
Quit	Saves all files, puts away Framework II and the Application Program.

Data Entry

Data entry in the selected file is accomplished by using several methods depending on the format of the data:

Text entries- type directly into cell highlighted. If text begins with a numeric such as phone numbers or street addresses, press the space bar first. This prevents the program from trying to calculate a formula with the number. To edit text, press the space bar and change or delete the previous entry.

Numeric entries- type directly into cell highlighted. If a formula is desired (this is for advanced users) press F2 before typing. To edit numbers, press F2 then change or delete the previous entry.

Date entries- use ALT-D to format and enter dates. This macro saves keystrokes by formatting the date and placing it in the cell highlighted. To change a date press ALT-D again.

These entry procedures are consistent throughout all the files in the Notebook. Refer to this page while using the program. Appendix C explains the layout of each file and the data types for each cell.

Report Generation

Simple reports or printouts of all records in a database or spreadsheet may be obtained by using the Alt-P function. If only certain records are desired the function will allow for the user to enter the file and highlight the desired records with the F6 (extend select) key and then resume the print command.

For the advanced user, FRED command functions may be used in the frame border of a database to filter out records not meeting the desired criteria and display only the pertinent records. User desiring this capability should refer to the Framework II manuals.

A simpler method of sorting data records is resident in the "Locate" menu of Framework II. By using the "Search" selection in this menu, the user can specify a specific word, phrase or number to look for in an entire frame. If the exact wording is not known wildcards may be used; '?' represents any one character and '*' represents multiple characters. Search will stop on each occurrence of the word or phrase in a frame. The "Ascending Sort" and "Descending Sort" selections in Locate allow for databases to be rearrange in high-to-low order or in low-to-high order. Sort can be executed for an entire frame or just on particular field. For example if the user wishes to sort the database by contract number, he can use one of the sort commands when the cursor is on the Contract Number field name.

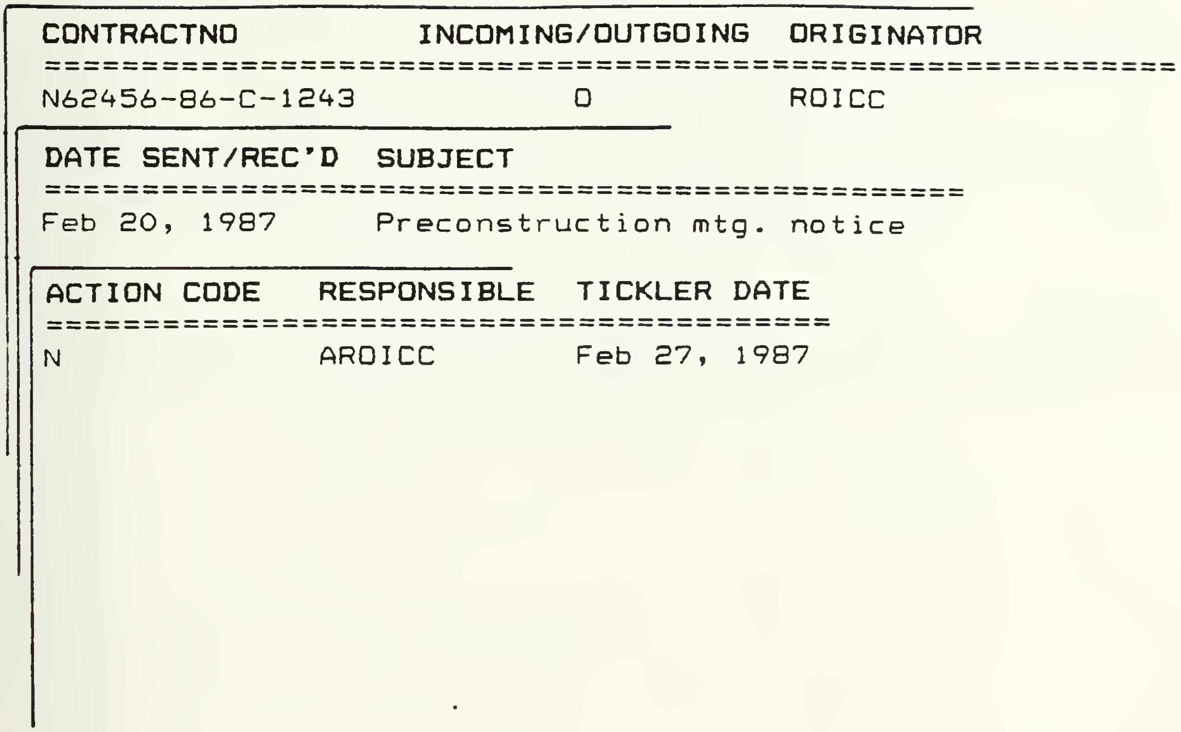
Detailed Example

Using the same example as outlined in the Introductory documentation on page 94, Figures B.13 to B.23 display the keystroke details used to access the data files, enter information and print results.

```
CONTRACTNO       DESCRIPTION
=========================================================================
N62456-86-C-1243Reroof Gym

CONTRACTOR                      CONADDRESS
=========================================================================
ABC Contracting                 453 Main St. Bremerton

POINT OF CONTACT  PHONE#        SUPT             JOB PHONE
=========================================================================
Jack Jones        456-9823      Jim Smith        876-3421

DATE AWARDED      AMOUNT        NUMBER DAYS CQC REF
=========================================================================
Feb 13, 1987      $132,000.00             90 Bob

PLANS & SPECS BY  A/E PHONE     EIC            PHONE
=========================================================================
Acme Design       876-4532      Mary Front     765-8769

BONDING CO      ADDRESS                  INSURANCE CO
=========================================================================
A-1 Good Guys   124 Denny Way SeattlSkyhigh Insur.

EXPIRATION DATE APPROPRIATION    FUNDS AVAIL   CUSTOMER
=========================================================================
Jun 30, 1987    AA84375-830455   $150,000.00 NAVSTA

POC             PHONE
==============================
Jonsey          457-3720
```

The Contract Record Card Represents general information about each contract such as the contractor's name and all points of contact involved in the construction process. It is a database where information is entered by way of macro programs.

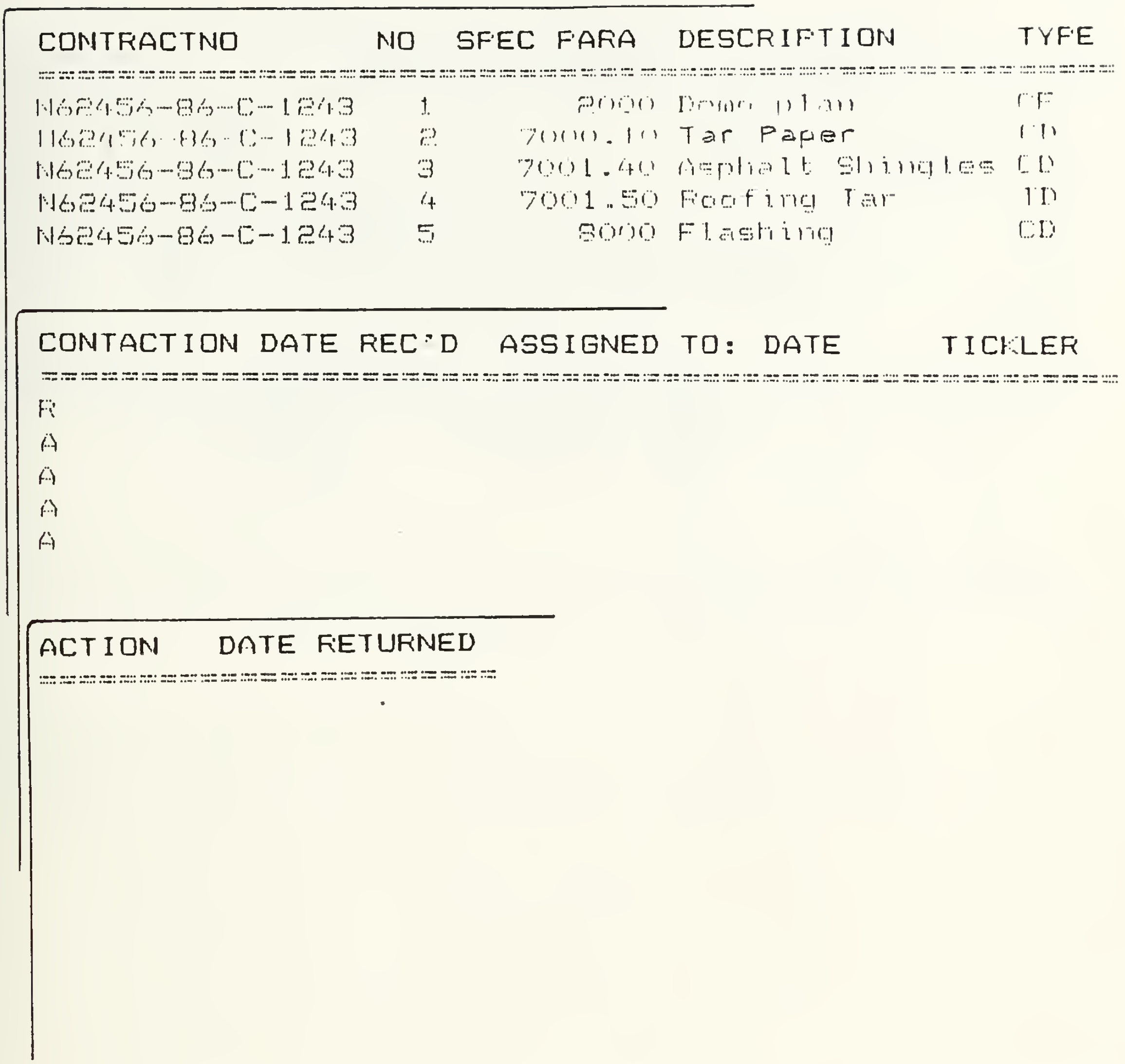
Figure B.13 Detailed Example Project Contract Record Card



```
CONTRACTNO              INCOMING/OUTGOING   ORIGINATOR
==============================================================
N62456-86-C-1243                O           ROICC

DATE SENT/REC'D  SUBJECT
================================================
Feb 20, 1987     Preconstruction mtg. notice

ACTION CODE   RESPONSIBLE   TICKLER DATE
======================================
N             AROICC        Feb 27, 1987
```

Select Job Records then Contract Record Card from menu. Use Alt-A to add data. General contract information is entered in the Contract Record Card immediately upon assignment to the AROICC. Use Alt-P to print.

Figure B.14 Detailed Example Project Job Correspondence Log #1



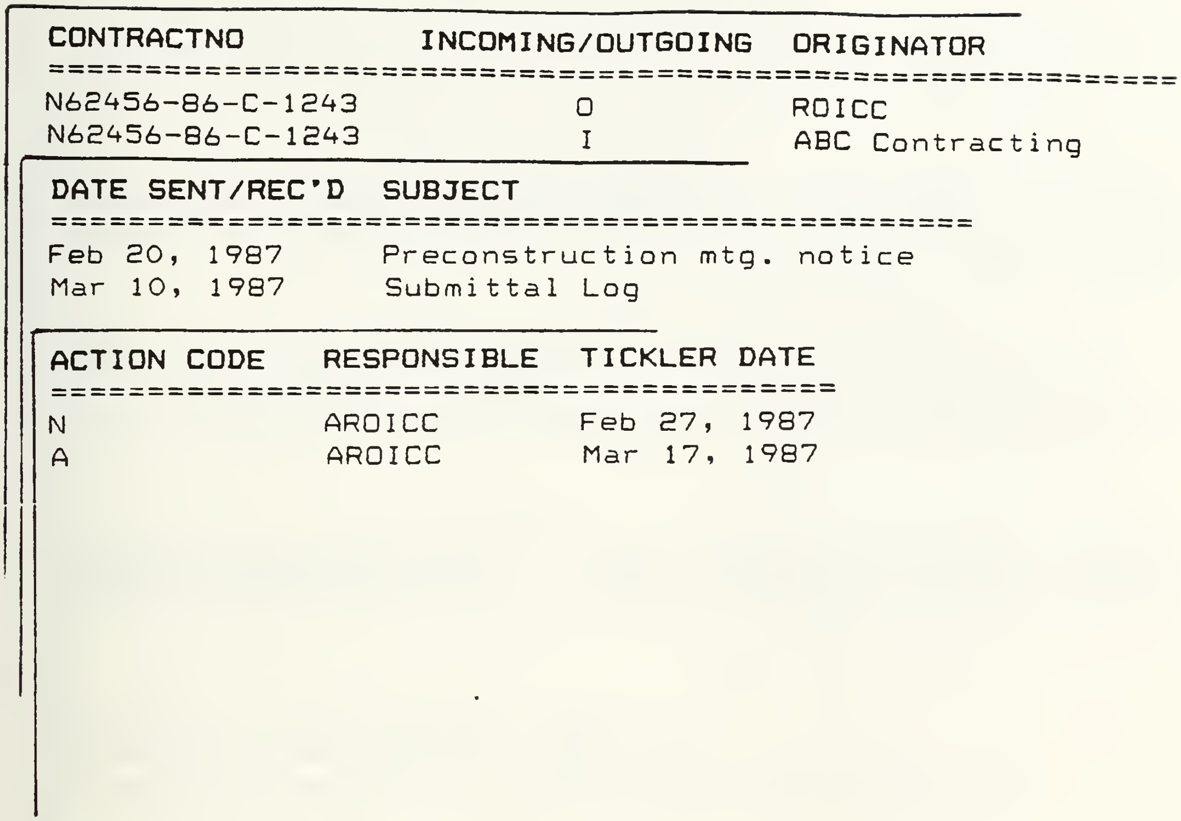
```
CONTRACTNO           NO   SPEC PARA   DESCRIPTION        TYPE
================================================================
N62456-86-C-1243      1        2000 Demo plan             CF
N62456-86-C-1243      2     7000.10 Tar Paper             CD
N62456-86-C-1243      3     7001.40 Asphalt Shingles      CD
N62456-86-C-1243      4     7001.50 Roofing Tar           TD
N62456-86-C-1243      5        8000 Flashing              CD
```

```
CONTACTION DATE REC'D  ASSIGNED TO: DATE      TICKLER
================================================================
R
A
A
A
A
```

```
ACTION   DATE RETURNED
=======================
```

Select Job Records then Job Correspondence Log from the menu. Use Alt-A to add data. Enter correspondence information including action code and a tickler date for followup. Use Alt-P to print.

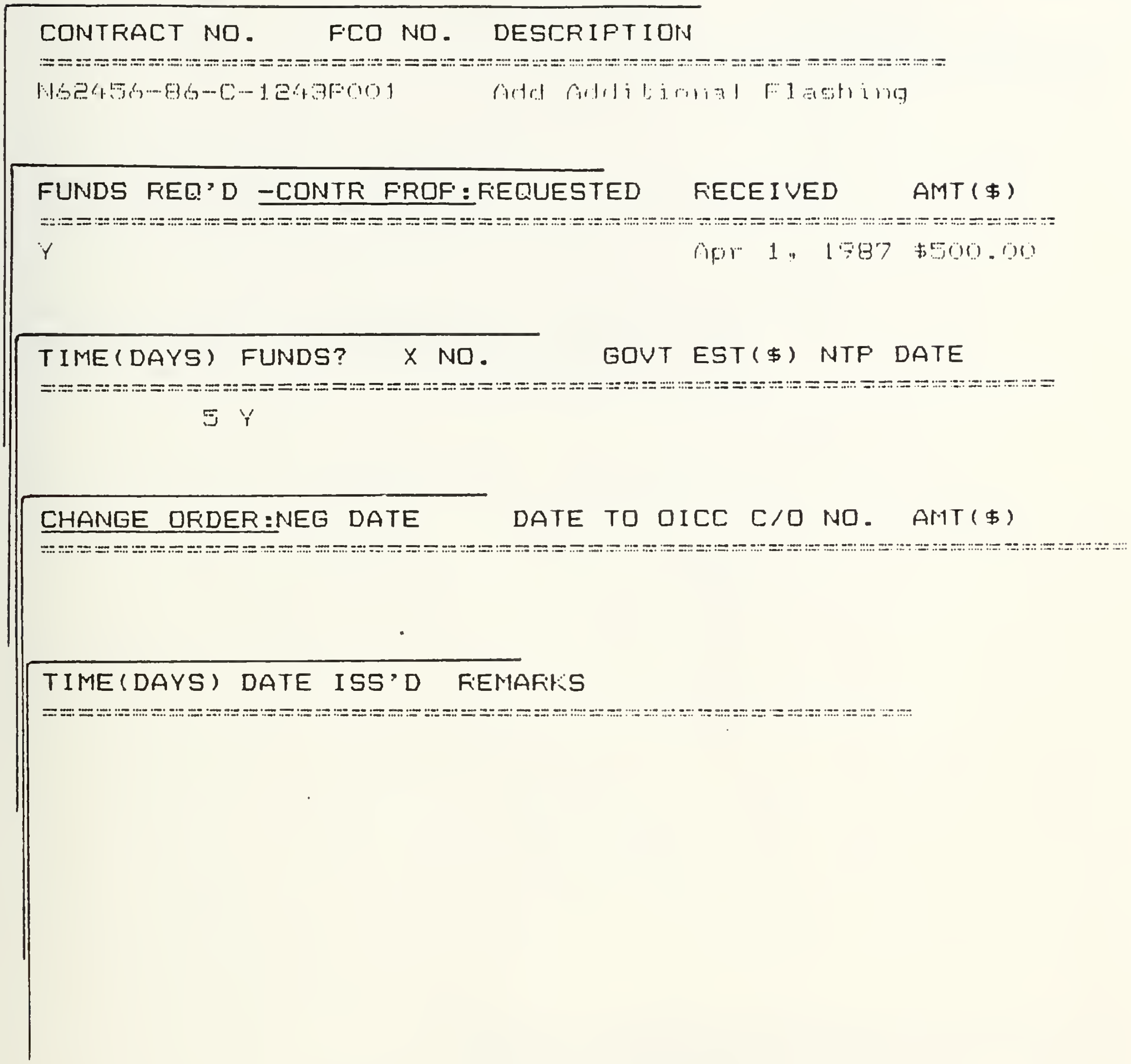
Figure B.15 Detailed Example Project Submittal Log



```
CONTRACTNO            INCOMING/OUTGOING  ORIGINATOR
=========================================================
N62456-86-C-1243              O          ROICC
N62456-86-C-1243              I          ABC Contracting

DATE SENT/REC'D  SUBJECT
==============================================
Feb 20, 1987     Preconstruction mtg. notice
Mar 10, 1987     Submittal Log

ACTION CODE   RESPONSIBLE  TICKLER DATE
=======================================
N             AROICC       Feb 27, 1987
A             AROICC       Mar 17, 1987
```

Select Job Records then Submittal Status Log from the menu. Use Alt-A to add data. Enter Submittal Log information after checking the contractor's submittal against the contract requirements. Use Alt-P to print.

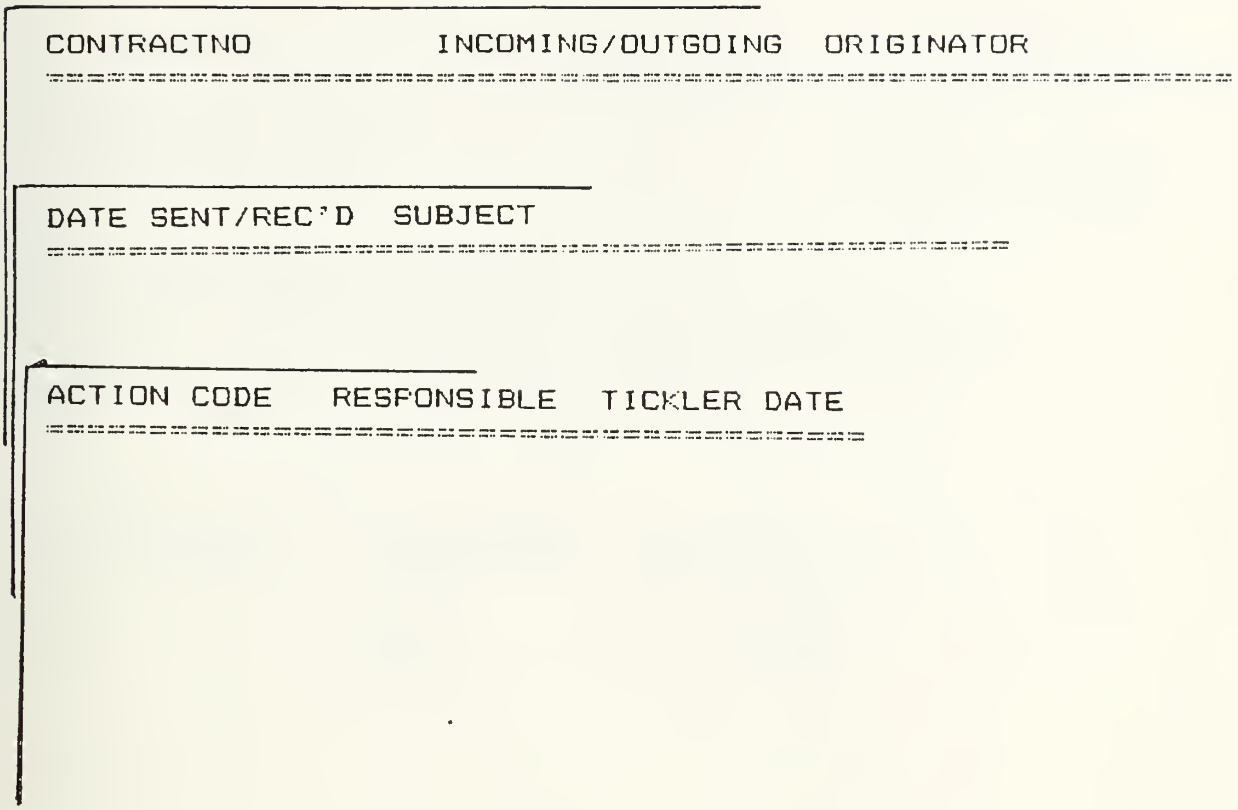
Figure B.16 Detailed Example Project Job Correspondence Log #2



```
CONTRACT NO.    PCO NO.  DESCRIPTION
=================================================================
N62456-86-C-1243P001     Add Additional Flashing

FUNDS REQ'D -CONTR PROP:REQUESTED   RECEIVED    AMT($)
=======================================================================
Y                                   Apr 1, 1987 $500.00

TIME(DAYS) FUNDS?   X NO.      GOVT EST($) NTP DATE
=======================================================================
         5 Y

CHANGE ORDER:NEG DATE      DATE TO OICC C/O NO.  AMT($)
=====================================================================================

TIME(DAYS) DATE ISS'D  REMARKS
==============================================================
```

Select Job Records then Prospective Change Order Log from menu. Use Alt-A to add data. Enter contractor's proposal for change and any information available on funding or negotiation. Use Alt-P to print.

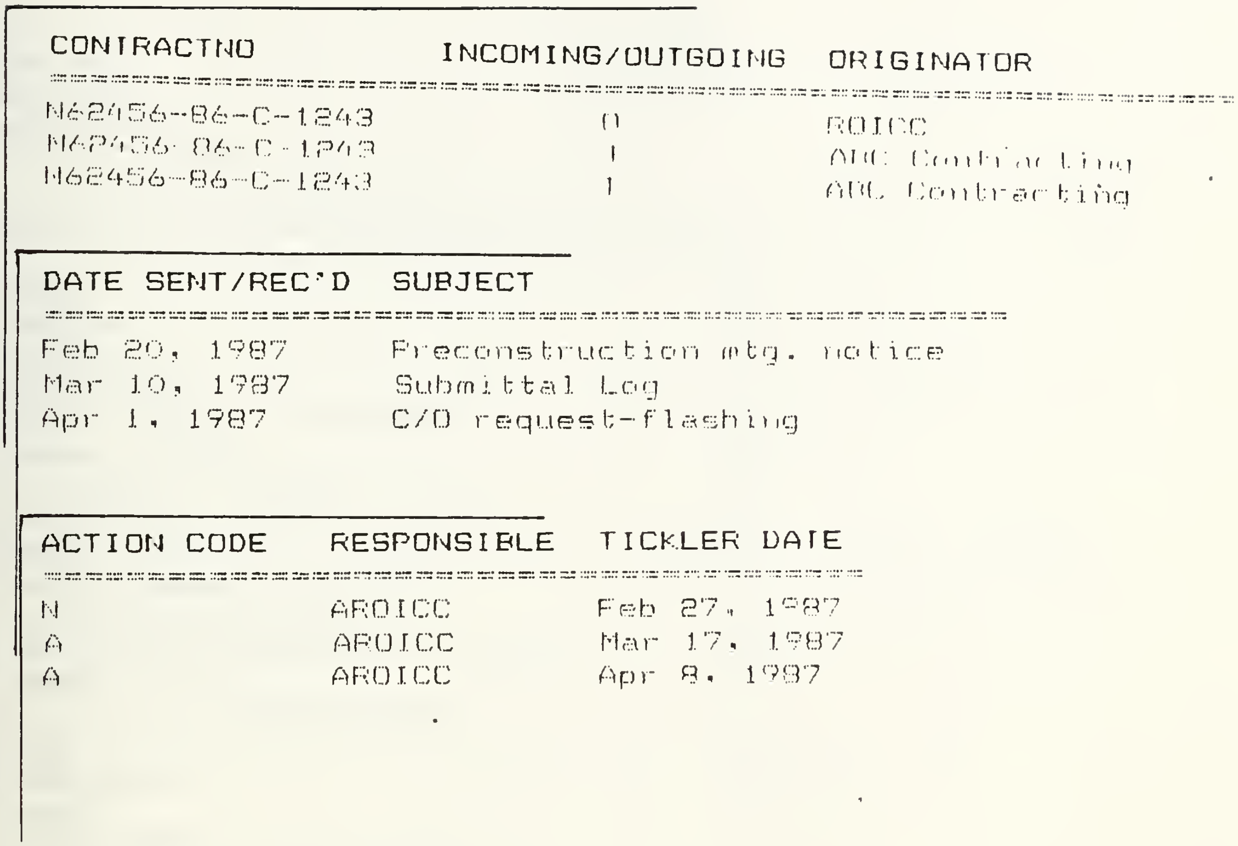
Figure B.17 Detailed Example Project Prospective Change Order Log #1



```
CONTRACTNO          INCOMING/OUTGOING  ORIGINATOR
=================================================================

DATE SENT/REC'D  SUBJECT
==================================================

ACTION CODE   RESPONSIBLE  TICKLER DATE
==========================================
```

Select Job Records then Job Correspondence Log from menu. Use F2 to enter formula area, type @not(Subject=*flashing*) then RETURN. This filters out any record that does not contain the word "flashing" in the subject. ("*" is a wild card representing multiple letters or words which are not specifically known.) As shown above, there are no records fitting this criteria. Use Alt-P to print.

Figure B.18 Detailed Example Project Correspondence Log Filtered on Subject=*flashing*



```
CONTRACTNO              INCOMING/OUTGOING   ORIGINATOR
==========================================================================
N62456-86-C-1243                O            ROICC
N62456-86-C-1243                I            ABC Contracting
N62456-86-C-1243                I            ABC Contracting

DATE SENT/REC'D   SUBJECT
==================================================
Feb 20, 1987      Preconstruction mtg. notice
Mar 10, 1987      Submittal Log
Apr 1, 1987       C/O request-flashing

ACTION CODE    RESPONSIBLE   TICKLER DATE
=============================================
N              AROICC        Feb 27, 1987
A              AROICC        Mar 17, 1987
A              AROICC        Apr 8, 1987
```

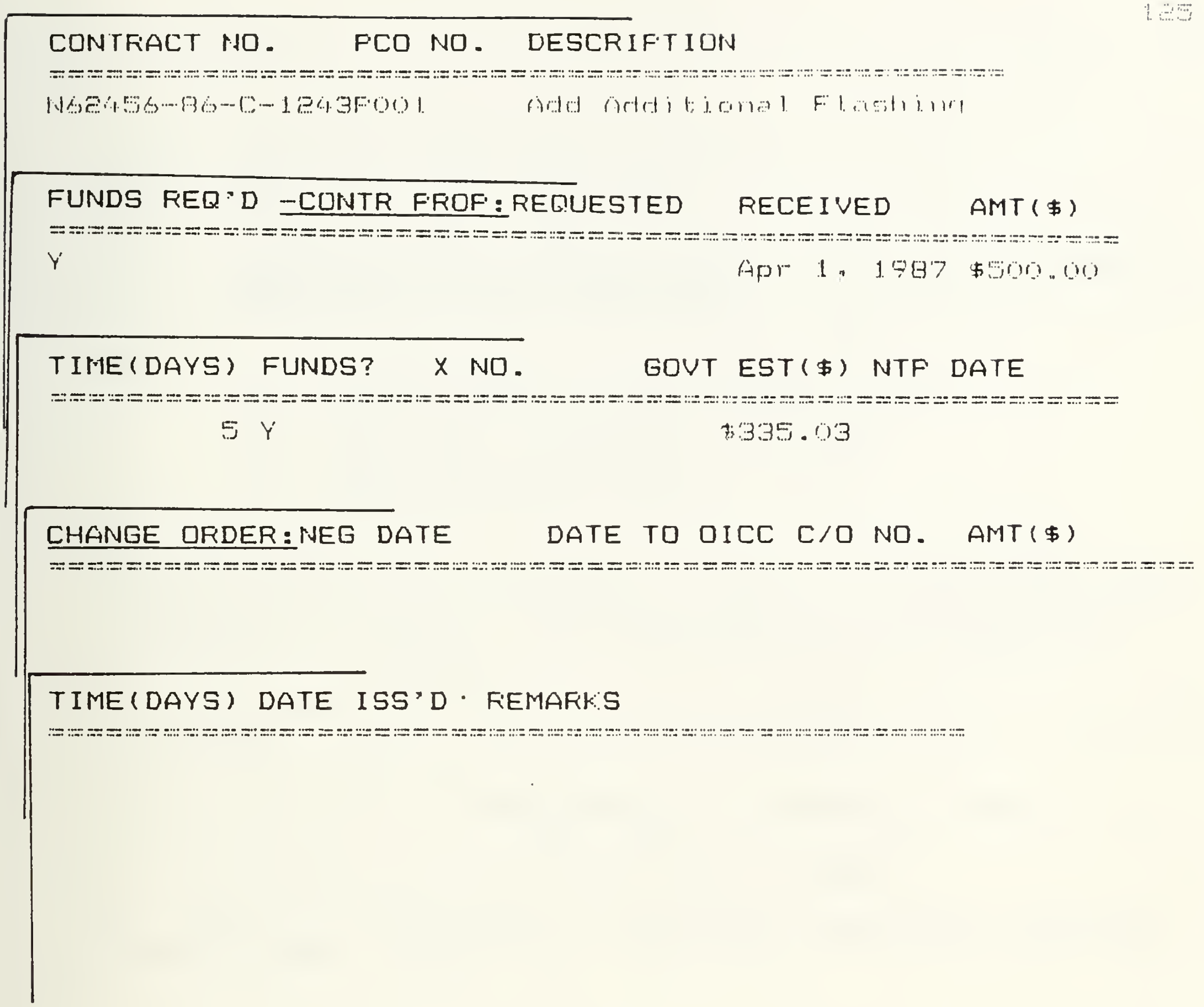
Select Job Records then Job Correspondence Log from the menu. Use Alt-A to enter the new letter information. Use Alt-P to print.

Figure B.19 Detailed Example Project Job Correspondence Log #3

```
DATE:                                                   Apr 5, 1987
CONTRACT NUMBER:                                        N62456-86-1243
CONTRACT TITLE:                                         Reroof Gym
CHANGE DESCRIPTION:
          Add additional flashing to roof

******************************************************************
______________________PRIME CONTRACTOR WORK___________________
1. LABOR                                                      100
2. FRINGE BENEFITS                                             43
3. MATERIAL                                                    50
4. RENTAL EQUIPMENT                                             0
5. OPERATING & MINOR MAINT. FOR OWNED EQUIP.                    0
6. SUBTOTAL (1+2+3+4+5)                                       193
7. FIELD OVERHEAD (   % OF LINE 6)                          19.30
8. LIABILITY & COMP. INSURANCE (   % OF LINE 1)                 1
9. SUBTOTAL (6+7+8)                                        213.30
10. HOME OFFICE OVERHEAD (   % OF LINE 9)                    6.40
11. EQUIPMENT OWNERSHIP EXPENSE                                 0
12. SOCIAL SECURITY & UNEMPLOYMENT INS. ( % OF LINE 1)       7.50
13. SUBTOTAL (9+10+11+12)                                  227.20
______________________SUBCONTRACTORS WORK_____________________
14. LABOR                                                      50
15. FRINGE BENEFITS                                            20
16. MATERIAL                                                    0
17. RENTAL EQUIPMENT                                            0
18. OPERATING & MINOR MAINT. FOR OWNED EQUIP.                   0
19. SUBTOTAL (14+15+16+17+18)                                  70
20. FIELD OVERHEAD (  % OF LINE 19)                          2.10
21. LIABILITY & COMP. INSURANCE (  % OF LINE 14)              .50
22. SUBTOTAL (19+20+21)                                     72.60
23. HOME OFFICE OVERHEAD (  % OF LINE 22)                    2.18
24. EQUIPMENT OWNERSHIP EXPENSE                                 0
25. SOCIAL SECURITY & UNEMPLOYMENT INS. (% OF LINE 14)       3.75
26. SUBTOTAL (22+23+24+25)                                  78.53
27. PROFIT (   % OF LINE 26)                                 4.71
28. SUBTOTAL (26+27)                                        83.24
__________________________SUMMARY____________________________
29. PRIME CONTRACTOR'S WORK                                227.20
30. SUBCONTRACTOR'S WORK                                    83.24
31. PRIME CONT. OVERHEAD ON SUBS WORK (  % OF LINE 30)       2.50
32. SUBTOTAL (29+30+31)                                    312.94
33. PRIME CONTRACTOR'S PROFIT (   % OF LINE 32)             18.78
34. SUBTOTAL (32+33)                                       331.71
35. PRIME CONTRACTOR BOND PREMIUM (   % OF LINE 34)          3.32
36. TOTAL COST (34+35)                                     335.03
******************************************************************
ESTIMATED TIME EXTENSION AND JUSTIFICATION:
Additional flashing required to replace deteriorated existing.
Not shown on plans.  Unforeseen.
```

Select Estimates then Change Order Estimate from the menu. Use Alt-A to add data. Enter %s for markup when prompted. Then enter description and costs. Use Alt-P to print.

Figure B.20 Detailed Example Project Change Order Estimate



```
CONTRACT NO.     PCO NO.  DESCRIPTION
=================================================================
N62456-86-C-1243P001      Add Additional Flashing

FUNDS REQ'D -CONTR PROP:REQUESTED   RECEIVED    AMT($)
======================================================================
Y                                   Apr 1, 1987 $500.00

TIME(DAYS) FUNDS?   X NO.      GOVT EST($) NTP DATE
======================================================================
         5 Y                      $335.03

CHANGE ORDER:NEG DATE      DATE TO OICC C/O NO.  AMT($)
===========================================================================

TIME(DAYS) DATE ISS'D  REMARKS
============================================================
```

Select Job Records then Prospective Change Order Log from menu. Use Alt-C to change information in existing records. Use + key to enter file, arrow keys to move to GOVTEST($) field and enter cost estimate value developed in cost estimate spreadsheet. Use Alt-P to print.

Figure B.21 Detailed Example Project Prospective Change Order Log #2

126
-C-   P/C
Ser

From: ROICC Northwest Area (Code 70)
To: OICC

Subj: PROPOSED CHANGE ORDER NO.**P01** TO CONSTRUCTION CONTRACT
N62456-86-C-1243, Reroof Gym

Encl: (1) Recommended Wording for Modification
(2) Negotiation Record of **4-15-87**
(3) Contractor's Estimate of **4-1-87**
(4) Negotiated Settlement
(5) Funding Document OA No. RCP No.

1. A change order is recommended under Clause(s) **17** of the General Provisions of subject contract in the **additive** amount of **$335.03** with **5**day(s) time extension in accordance with enclosures (1) through **(3)**, worded as shown on enclosure (1).

2. The change order when issued supersedes the following Notices to Proceed:

ROICC letter serial **11100-87-86** of **4-12-87** for **$400.00**
of for

3. The Reason Code for this change is: **UNFO**

4. Reason for the change: **Unforeseen condition, existing flashing deteriorated**

Approved/Disapproved:

LT I. AM ABLE, CEC,USN

OICC

ROICC Concurrence

bcc:
WESTNAVFACENCGCOM (Code 022.11)

Figure B.22 Detailed Example Change Order Proposal Form (page 1 of 3)

SUGGESTED WORDING FOR PROPOSED CHANGE (P/C) P01, CONTRACT N62456-86-C-1243

"As a change to the subject contract you are hereby directed to provide all labor, approved material, and equipment necessary to accomplish the work listed below:

Accomplish additional flashing work as an in-scope change to the contract with an extension of time due to unforeseen conditions.

"The contract price is additive $335.03 and the contract time is increased 5 days."

increased $335.03

"The foregoing is agreed to as constituting full and complete equitable adjustment in full accord with General Provisions Clause, EQUITABLE ADJUSTMENT: WAIVER AND RELEASE OF CLAIMS (7-76)."

Figure B.22 Detailed Example Change Order Proposal Form
(page 2 of 3)

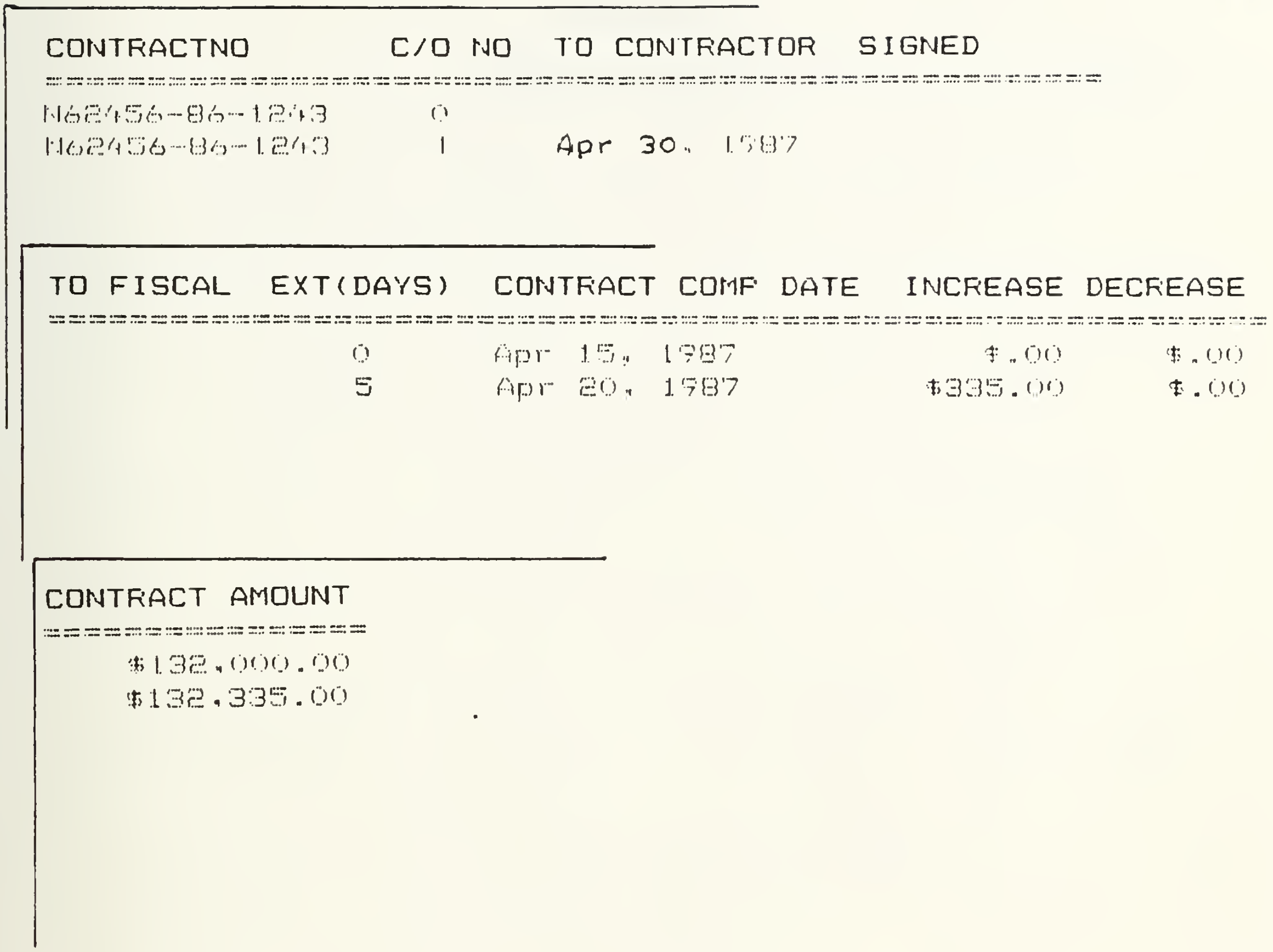
NEGOTIATION RECORD FOR PROPOSED CHANGE (P/C)**P01**, CONTRACT **N62456-86-C-1243**

Date and Place: **15 April 1987 ROICC Office, Silverdale**
For the Government: **Lt. I. Am Able,CEC, USN**
For the Contractor: **Jack Jones, Owner**
Contractor's Proposal: **$500.00** and **5** days time extension (Encl(3))
Government Estimate: **$335.03** and **5** days time extension (Encl(4))
Negotiated Settlement: **$335.00** and **5** days time extension (Encl ( ))

SUMMARY OF NEGOTIATIONS:
Contractor agrees to Government Estimate rounded to the nearest dollar.

Select Correspondence and Change Order Proposal Form from menu. Use Alt-A to add information on this change order proposal and results of negotiations to the database. Then use Alt-P to mailmerge the database with the form letter shown here. Bold text represents the information from the database.

Figure B.22 Detailed Example Change Order Proposal Form (page 3 of 3)



```
CONTRACTNO          C/O NO   TO CONTRACTOR   SIGNED
=====================================================================
N62456-86-1243        0
N62456-86-1243        1        Apr 30, 1987


TO FISCAL   EXT(DAYS)   CONTRACT COMP DATE   INCREASE DECREASE
======================================================================
                0       Apr 15, 1987            $.00      $.00
                5       Apr 20, 1987         $335.00      $.00


CONTRACT AMOUNT
===================
     $132,000.00
     $132,335.00
```

Select Job Records then Official Change Order Log from menu. Use Alt-A to add information. Enter data on new change order and new price and completion time. Use Alt-P to print.

Figure B.23 Detailed Example Project Change Order Log

APPENDIX C

TEMPLATE DESCRIPTIONS

CONTRACT RECORD CARD

FIELD	DESCRIPTION	CODING
CONTRACTNO	Contract number	Alpha-Numeric
DESCRIPTION	Short description of job	Alpha
CONTRACTOR	Contractor's name	Alpha
CONADDRESS	Contractor's office address	Alpha-Numeric
POINT OF CONTACT	Contractor's point of contact for job	Alpha
PHONE#	Contractor's home office phone	Numeric (999)999-9999
SUPT	Superintendent's name	Alpha
JOB PHONE	Job shack phone or superintendent's beeper	Numeric (999)999-9999
DATE AWARDED	Contract award date	Alpha-Numeric MMM DD,YYYY
AMOUNT	Original contract price	Numeric
NUMBER DAYS	Length of contract	Numeric
CQC REP	Name of government inspector	Alpha
PLANS&SPECS BY	Name of design firm	Alpha
A/E PHONE	Designer's phone	Numeric (999)999-9999
EIC	Engineer in charge of project at EFD	Alpha
PHONE	EIC's phone number	Numeric (999)999-9999
BONDING CO	Name of contractor's surety	Alpha
ADDRESS	Bonding company's address	Alpha-Numeric
INSURANCE CO	Contractor's liability carrier	Alpha

EXPIRATION DATE	Insurance policy expiration date	Numeric MMM DD,YYYY
APPROPRIATION	Appropriation data	Alpha-Numeric
FUNDS AVAIL	Total funds available for job	Numeric
CUSTOMER	User command	Alpha
POC	Customer's point of contact	Alpha
PHONE	POC's phone	Numeric (999)999-9999

JOB CORRESPONDENCE LOG

FIELD	DESCRIPTION	CODING
CONTRACTNO	Contract Number	Alpha-Numeric
INCOMING/OUTGOING	Incoming or outgoing correspondence	Alpha I-incoming O-outgoing
ORIGINATOR	Name of company or command originating correspondence	Alpha
DATE SENT/REC'D	Date signed for outgoing Date received for incoming	Numeric MMM DD,YYYY
SUBJECT	Brief subject title	Alpha
ACTION CODE	Action required	Alpha A-action I-info only
RESPONSIBLE	Person or code responsible for action, blank for info items	Alpha
TICKLER DATE	Followup date for action items, blank for info	Numeric MMM DD,YYYY

SUBMITTAL STATUS LOG

FIELD	DESCRIPTION	CODING
CONTRACTNO	Contract number	Alpha-Numeric
NO	Submittal number assigned by contractor	Numeric
SPEC PARA	Specification paragraph where submittal requirement is located	Numeric
DESCRIPTION	Short description of submittal	Alpha
TYPE	Type of submittal CE-certification SD-shop drawing TD-test data CD-catalog data S-sample	Alpha
CONTACTION	Contractor action A-forwarded to ROICC for action R-forwarded to ROICC for record	Alpha
REC'D	Date received at ROICC office	Numeric MMM DD,YYYY
ASSIGNED TO:	Person or code assigned action	Alpha
DATE	Date forwarded to assigned code	Numeric MMM DD,YYYY
TICKLER	Tickler date to followup on action	Numeric MMM DD,YYYY
ACTION	Action taken by ROICC A-approved as submitted B-approved as noted C-disapproved	Alpha
DATE RETURNED	Date returned to contractor	Numeric MMM DD,YYYY

PROSPECTIVE CHANGE ORDER LOG

FIELD	DESCRIPTION	CODING
CONTRACT NO.	Contract number	Alpha-Numeric
PCO NO.	Prospective change order number	Alpha-Numeric P-XXXX
DESCRIPTION	Brief description of change	Alpha
FUNDS REQ'D	Have funds been requested from EFD?	Alpha Y/N
CONTR PROP:	Beginning of contractor proposal section	blank
REQUESTED	Date request for proposal was mailed	Numeric MMM DD,YYYY
RECEIVED	Date proposal was received from contractor	Numeric MMM DD,YYYY
AMT($)	Amount of contractor's proposal	Numeric
TIME(DAYS)	Time extension requested	Numeric
FUNDS?	RCP amendment number or date funding confirmed	Alpha-Numeric
X NO.	Obligation Authorization number	Alpha-Numeric
GOVT EST($)	Amount of Government estimate	Numeric
NTP DATE	Date of Notice to Proceed, if issued	Numeric MMM DD,YYYY
CHANGE ORDER:	Beginning of change order data	blank
NEG DATE	Date of negotiation	Numeric MMM DD,YYYY
DATE TO OICC	Date negotiation results were forwarded for approval	Numeric MMM DD,YYYY
C/O NO.	Change order number	Numeric
AMT($)	Amount of negotiated change order	Numeric

TIME(DAYS)	Time extension or reduction	Numeric
DATE ISS'D	Date change order was issued	Numeric MMM DD,YYYY
REMARKS	Any pertinent remarks on the status of change	Alpha

OFFICIAL CHANGE ORDER LOG

FIELD	DESCRIPTION	CODING
CONTRACTNO	Contract number	Alpha-Numeric
C/O NO	Change order number	Numeric
TO CONTRACTOR	Date forwarded to contractor	Numeric MMM DD,YYYY
SIGNED	Date signed by contractor	Numeric MMM DD,YYYY
TO FISCAL	Date forwarded to fiscal after contractor signed	Numeric MMM DD,YYYY
EXT(DAYS)	Time extension or reduction	Numeric
CONTRACT COMP DATE	New contract completion date	Numeric MMM DD,YYYY
INCREASE	Amount contract value increased	Numeric
DECREASED	Amount contract value decreased	Numeric
CONTRACT AMOUNT	New total value of contract	Numeric

APPENDIX D

PROGRAM LISTINGS

```
Contract Administrator's Notebook:
   @keyfilter({all}),
   @menu(Contract Administrator's Notebook),
   @setmacro({Alt-A},Contract Administrator's Notebook.Macros.Add),
   @setmacro({Alt-C},Contract Administrator's Notebook.Macros.Change),
   @setmacro({Alt-D},Contract Administrator's Notebook.Macros.Date),
   @setmacro({Alt-R},Contract Administrator's Notebook.Macros.Remove),
   @setmacro({Alt-P},Contract Administrator's Notebook.Macros.Print),
   @setmacro({Alt-M},Contract Administrator's Notebook.Macros.Menu),
   @setmacro({Alt-Q},Contract Administrator's Notebook.Macros.Quit)


Contract Administrator's Notebook.Job Records:
   @menu(job records)


Contract Administrator's Notebook.Job Records.Contract Record Card:
   @quitmenu,
   @setselection("Contract Administrator's Notebook.Data Storage.Contract Record Card Database"),
   @performkeys("{f10}{ctrl-f}0"),
   Current Selection:="Contract Record Card Database"


Contract Administrator's Notebook.Job Records.Job Correspondence Log:
   @quitmenu,
   @setselection("Contract Administrator's Notebook.Data Storage.Job Correspondence Log Database"),
```

```
   @performkeys("{f10}{ctrl-f}0"),

   Current Selection:="Job Correspondence Log Database"



Contract Administrator's Notebook.Job Records.Submittal Status Log:

   @quitmenu,

   @setselection("Contract Administrator's Notebook.Data Storage.Submittal Status Log Database"),

   @performkeys("{f10}{ctrl-f}0"),

   Current Selection:="Submittal Status Log Database"



Contract Administrator's Notebook.Job Records.Prospective Change Order Log:

   @quitmenu,

   @setselection("Contract Administrator's Notebook.Data Storage.Prospective Change Order Log Database"),

   @performkeys("{f10}{ctrl-f}0"),

   Current Selection:="Prospective Change Order log Database"



Contract Administrator's Notebook.Job Records.Official Change Order Log:

   @quitmenu,

   @setselection("Contract Administrator's Notebook.Data Storage.Official Change Order Log Database"),

   @performkeys("{f10}{ctrl-f}0"),

   Current Selection:="Official Change Order Log Database"



Contract Administrator's Notebook.Estimates:

   @menu(estimates)
```

```
Contract Administrator's Notebook.Estimates.Change Order Estimate:

   @quitmenu,

   @setselection("Contract Administrator's Notebook.Data Storage.Change Order Estimate Spreadsheet"),

   @performkeys("{f10}{ctrl-f}0"),

   Current Selection:="Change Order Estimate Spreadsheet"



Contract Administrator's Notebook.Correspondence:

   @menu(correspondence)



Contract Administrator's Notebook.Correspondence.Change Order Proposal Form:

   @quitmenu,

   @setselection("Contract Administrator's Notebook.Data Storage.Change Order Proposal Database"),

   @performkeys("{f10}{ctrl-f}0"),

   Current Selection:="Change Order Proposal Database"



Contract Administrator's Notebook.Macros.Add:

   @if(Current Selection="Contract Record Card Database",

       @list(@setselection("Data Storage.Contract Record Card Database"),

       @performkeys("{dnlevel}{ctrl-end}{home}{ctrl-C}R1{return}"),

       @eraseprompt,

       @prompt("Enter Data, use Return & Arrow keys to move, ESC when finished with record"),

       @keyfilter({esc},Macros.Add Another)

       ),

       @list(@if(Current Selection="Job Correspondence Log Database",
```

```
Contract Administrator's Notebook.Macros.Add:
  @if(Current Selection="Contract Record Card Database",
      @list(@setselection("Data Storage.Contract Record Card Database"),
      @performkeys("{dnlevel}{ctrl-end}{home}{ctrl-C}R1{return}"),
      @eraseprompt,
      @prompt("Enter Data, use Return & Arrow keys to move, ESC when finished with record"),
      @keyfilter({esc},Macros.Add Another)
      ),
      @list(@if(Current Selection="Job Correspondence Log Database",
          @list(@setselection("Data Storage.Job Correspondence Log Database"),
          @performkeys("{dnlevel}{ctrl-end}{home}{ctrl-C}R1{return}"),
          @eraseprompt,
          @prompt("Enter Data, use Return & Arrow keys to move, ESC when finished with record"),
          @keyfilter({esc},Macros.Add Another)
          ),
      @list(@if(Current Selection="Submittal Status Log Database",
          @list(@setselection("Data Storage.Submittal Status Log Database"),
          @performkeys("{dnlevel}{ctrl-end}{home}{ctrl-C}R1{return}"),
          @eraseprompt,
          @prompt("Enter Data, use Return & Arrow keys to move, ESC when finished with record"),
          @keyfilter({esc},Macros.Add Another)
          ),
          @list(@if(Current Selection="Prospective Change Order Log Database",
              @list(@setselection("Data Storage.Prospective Change Order Log Database"),
              @performkeys("{dnlevel}{ctrl-end}{home}{ctrl-C}R1{return}"),
              @eraseprompt,
              @prompt("Enter Data, use Return & Arrow keys to move, ESC when finished with record"),
```

```
            @keyfilter({esc},Macros.Add Another)

            ),

            @list(@if(Current Selection="Official Change Order Log Database",

                @list(@setselection("Data Storage.Official Change Order Log Database"),

                @performkeys("{dnlevel}{ctrl-end}{home}{ctrl-C}R1{return}"),

                @eraseprompt,

                @prompt("Enter Data, use Return & Arrow keys to move, ESC when finished with record"),

                @keyfilter({esc},Macros.Add Another)

                ),

                @list(@if(Current Selection="Change Order Estimate Spreadsheet",

                @list(@setselection("Data Storage.Change Order Estimate Spreadsheet"),

                @performkeys("{dnlevel}{ctrl-home}"),

                @eraseprompt,

                @prompt("Please Wait, Clearing Spreadsheet Entries",15),

                @echo(#OFF),

                @performkeys("{rightarrow}{f6}{ctrl-5}{dnarrow}{return}{del}"),

                @setselection("Data Storage.Change Order Estimate Spreadsheet.A5"),

                @performkeys("{f6}{dnarrow}{return}{del}"),

                @setselection("Data Storage.Change Order Estimate Spreadsheet.A49"),

                @performkeys("{f6}{ctrl-5}{dnarrow}{return}{del}"),

@fill(Data Storage.Change Order Estimate Spreadsheet.B9:Data Storage.Change Order Estimate Spreadsheet.B21," "),

@fill(Data Storage.Change Order Estimate Spreadsheet.B23:Data Storage.Change Order Estimate Spreadsheet.B37, " "),

@fill(Data Storage.Change Order Estimate Spreadsheet.B39:Data Storage.Change Order Estimate Spreadsheet.B46, " "),

                @setselection("Data Storage.Change Order Estimate Spreadsheet.B1"),

                @performkeys("{f9}"),

                @echo(#ON),

@local(FIELDOH,LIABINS,HOMEOH,SSUNMINS,SUBFIELDOH,SUBLIABINS,SUBHOMEOH,SUBSSUNMINS,SUBPROFIT,PRIMEOHONSUB,PROFIT,BOND
```

```
FIELDOH:=@inputline("Input Prime's Field Overhead as a Percentage","0",#NO,#YES,#NO),

LIABINS:=@inputline("Input Prime's Liability & Comprehensive Insurance as a Percentage","0",#NO,#YES,#NO),

HOMEOH:=@inputline("Input Prime's Home Office Overhead as a Percentage","0",#NO,#YES,#NO),

SSUNMINS:=@inputline("Input Prime's Social Security & Unemployment Insurance as a Percentage","0",#NO,#YES,#NO),

SUBFIELDOH:=@inputline("Input Sub's Field Overhead as a Percentage","0",#NO,#YES,#NO),

SUBLIABINS:=@inputline("Input Sub's Liability & Comprehensive Insurance as a Percentage","0",#NO,#YES,#NO),

SUBHOMEOH:=@inputline("Input Sub's Home Office Overhead as a Percentage","0",#NO,#YES,#NO),

SUBSSUNMINS:=@inputline("Input Sub's Social Security & Unemployment Insurance as a Percentage","0",#NO,#YES,#NO),

SUBPROFIT:=@inputline("Input Sub's Profit as a Percentage","0",#NO,#YES,#NO),

PRIMEOHONSUB:=@inputline("Input Prime's Overhead on Sub's Work as a Percentage","0",#NO,#YES,#NO),

PROFIT:=@inputline("Input Prime's Profit as a Percentage","0",#NO,#YES,#NO),

BOND:=@inputline("Input Prime's Bond as a Percentage","0",#NO,#YES,#NO),

            @echo(#OFF),

            @setselection("Data Storage.Change Order Estimate Spreadsheet.B15"),

            @performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

                    FIELDOH&

                    "/100*B14{return}"),

            @setselection("Data Storage.Change Order Estimate Spreadsheet.B16"),

            @performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

                    LIABINS&

                    "/100*B9{return}"),

            @setselection("Data Storage.Change Order Estimate Spreadsheet.B18"),

            @performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

                    HOMEOH&

                    "/100*B17{return}"),

            @setselection("Data Storage.Change Order Estimate Spreadsheet.B20"),

            @performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&
```

```
            SSUNMINS&

            "/100*B9{return}"),

@setselection("Data Storage.Change Order Estimate Spreadsheet.B29"),

@performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

            SUBFIELDOH&

            "/100*B28{return}"),

@setselection("Data Storage.Change Order Estimate Spreadsheet.B30"),

@performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

            SUBLIABINS&

            "/100*B23{return}"),

@setselection("Data Storage.Change Order Estimate Spreadsheet.B32"),

@performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

            SUBHOMEOH&

            "/100*B31{return}"),

@setselection("Data Storage.Change Order Estimate Spreadsheet.B34"),

@performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

            SUBSSUNMINS&

            "/100*B23{return}"),

@setselection("Data Storage.Change Order Estimate Spreadsheet.B36"),

@performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

            SUBPROFIT&

            "/100*B35{return}"),

@setselection("Data Storage.Change Order Estimate Spreadsheet.B41"),

@performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&

            PRIMEOHONSUB&

            "/100*B40{return}"),

@setselection("Data Storage.Change Order Estimate Spreadsheet.B43"),
```

```
        @performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&
                PROFIT&
                "/100*B42{return}"),
        @setselection("Data Storage.Change Order Estimate Spreadsheet.B45"),
        @performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{del}"&
                BOND&
                "/100*B44{return}"),
        @echo(#ON),
        @setselection("Data Storage.Change Order Estimate Spreadsheet.B1"),
        @eraseprompt,
        @prompt("Enter Data, use Return & Arrow keys to move, ESC when finished with record"),
        @keyfilter({esc},Macros.Print)
        ),
        @list(@if(Current Selection="Change Order Proposal Database",
          @list(@setselection("Data Storage.Change Order Proposal Database"),
          @performkeys("{dnlevel}{ctrl-end}{home}{ctrl-C}R1{return}"),
          @eraseprompt,
          @prompt("Enter Data, use Return & Arrow keys to move, ESC when finished with record"),
          @keyfilter({esc},Macros.Add Another)
      )
      )
     )
    )
  )
)
)
)
```

```
  )

  )

  )

  )

  )

  )



Contract Administrator's Notebook.Macros.Add Another:

  @keyfilter({all}),

  @eraseprompt,

  @performkeys("{uplevel}"),

  @prompt ("Add Another Record?",25),

  @if(@or(@nextkey={y},@key={Y}),

     @performkeys("{Alt-A}"),

     @list(@eraseprompt,

        @prompt("Use Alt-<key> to Quit, Print or return to Menu",10)

     )

  )



Contract Administrator's Notebook.Macros.Change:

  @keyfilter({all}),

  @eraseprompt,

  @prompt("Edit as desired.  Hit ESC when Finished.",15),

  @keyfilter({esc},Change Continue)
```

```
Contract Administrator's Notebook.Macros.Change Continue:

  @keyfilter({all}),

  @setselection("Contract Administrator's Notebook"),

  @performkeys("{f10}{f5}")



Contract Administrator's Notebook.Macros.Date:

  @keyfilter({all}),

  @eraseprompt,

  @local(YEAR,MONTH,DAY,DATE),

  @performkeys("{F2}{ctrl-home}{F6}{ctrl-end}{return}{del}"),

  YEAR:=@inputline("Input the year in 4 digits","1987",#NO,#YES,#NO),

  MONTH:=@inputline("Input the month in 2 digits","00",#NO,#YES,#NO),

  DAY:=@inputline("Input the day in 2 digits","00",#NO,#YES,#NO),

  @performkeys("@date1(@date("&

      YEAR&

      ","&

      MONTH&

      ","&

      DAY&

      ")){return}"),

  @eraseprompt,

  @prompt("Enter Data, Use Return & Arrow Keys to Move, ESC when Finished with Record"),

  @if(Current Selection="Change Order Estimate Spreadsheet",

      @keyfilter({esc},Macros.Print),

      @keyfilter({esc},Macros.Add Another)

  )
```

```
Contract Administrator's Notebook.Macros.Remove:

   @keyfilter({all}),

   @eraseprompt,

   @prompt("Are You Sure You Want To Delete This Record? Not Undoable!",10),

   @if(@or(@nextkey={y},@key={Y}),

       @performkeys("{ctrl-e}RY"),

       @list(@eraseprompt,

       @performkeys("{uplevel}"),

           @prompt("Use Arrow Keys To Select Records For Deletion, Then Alt-R to Remove",5)

       )

   )



Contract Administrator's Notebook.Macros.Print:

   @local(Spacing,Condensed,Quality),

   @keyfilter({all}),

   @eraseprompt,

   @if(Current Selection="Change Order Proposal Database",

       @list(@prompt("Are You Ready to Print This Data on the Form Letter?",5),

           @if(@or(@nextkey={y},@key={Y}),

               @list(@setselection("Data Storage.Change Order Proposal Form Template"),

                   @performkeys("{ctrl-A}MData Storage.Change Order Proposal Database{return}")

               ),

               @list(@eraseprompt,

                   @prompt("Use Alt-C to edit data or Alt-M to return to Menu",10)

               )

           )
```

```
    ),

@list(@if(Current Selection="Change Order Estimate Spreadsheet",

    @list(

        @eraseprompt,

        @setselection("Data Storage.Change Order Estimate Spreadsheet"),

        @prompt("Do You Wish to Print This Estimate",15),

        @if(@or(@nextkey={Y}, @key={y}),

            @list(@setselection("Data Storage.Change Order Estimate Spreadsheet"),

                @performkeys("{ctrl-P}FS1{return}C{uplevel}B")

            ),

            @list(@eraseprompt,

                @prompt("Use Alt-C to Change Data or Alt-M to Return to Menu",5)

            )

            )

        ),


@list(

        @eraseprompt,

        @setselection("Data Storage."&Current Selection),

        @prompt("Do You Wish To Print Whole Document? Y/N OR Only Selected Records?",5),

        @if(@or(@nextkey={y},@key={Y}),

            @list(@eraseprompt,

        Spacing:=@inputline("What Spacing Would You Like Between Lines?  1=Single, 2=Double, etc.","1",#NO,#YES,#YES),
                          What Spacing Would You Like Between Lines?  1=Single, 2=Double, etc.


        Condensed:=@inputline("Would You Like Condensed Print (17 char./in.)?  Y/N","N",#NO,#YES,#YES),

        Quality:=@inputline("Would You Like Letter Quality Print (Default Is Draft)?","N",#NO,#YES,#YES),

                @performkeys("{ctrl-p}FPS"&Spacing&"{return}"),

            @if(@or(Condensed="Y",Condensed="y"),
```

```
                    @performkeys("C")
                    ),
                    @if(@or(Quality="Y",Quality="y"),
                        @performkeys("Q")
                        ),
                    @performkeys("{uplevel}B")
                    ),
                @list(@eraseprompt,
                    @prompt("Use F6 & Arrow Keys To Highlight Selected Records Then ESC To Print",3),
                    @keyfilter({esc},Macros.Print Selected Records)
                )
            )
        )

            )
        )
    )


Contract Administrator's Notebook.Macros.Print Selected Records:
    @local(Spacing,Condensed,Quality),
    @keyfilter({all}),
    @eraseprompt,
    Spacing:=@inputline("What Spacing Would You Like Between Lines?  1=Single, 2=Double, etc.","1",#NO,#YES,#YES),
    Condensed:=@inputline("Would You Like Condensed Print (17 char./in.)?","N",#NO,#YES,#YES),
    Quality:=@inputline("Would You Like Letter Quality Pring (Default Is Draft)?","N",#NO,#YES,#YES),
```

```
    @performkeys("{ctrl-p}FPS"&Spacing&"{return}"),
    @if(@or(Condensed="Y",Condensed="y"),
        @performkeys("C")
    ),
    @if(@or(Quality="Y",Quality="y"),
        @performkeys("Q")
    ),
    @performkeys("{uplevel}B"),
    @performkeys("{uplevel}")


Contract Administrator's Notebook.Macros.Menu:
    @setselection("Contract Administrator's Notebook"),
    @performkeys("{f10}"),
    @performkeys("{f5}")


Contract Administrator's Notebook.Macros.Quit:
    @keyfilter({all}),
    @eraseprompt,
    @prompt("Are you sure you want to quit program?",15),
    @if(@or(@nextkey={n},@key={N}),
      @list(@eraseprompt,
            @prompt("Hit Alt-M to return to Main Menu",15)
        ),
      @list(@eraseprompt,
            @prompt("Thanks for using the Contract Administrator's Notebook",10),
```

```
        @setselection("Contract Administrator's Notebook"),

        @performkeys("{ctrl-f}0{f10}{ctrl-d}@yyy")

    )

)
```

APPENDIX E

USA-CERL SOFTWARE LIBRARY UPDATE
DECEMBER 1986

USA-CERL Software Library Update

The USA-CERL construction microcomputer application library has more than 48 programs available free of charge to all interested persons. We have entered a detailed one-page information sheet on these programs into our dial-up Harris library. To use the library, access the USA-CERL Harris 500 with a terminal or micro emulating a VT-100 by calling FTS 958-7250 or commercial 217-373-7250. Once you are connected, press 6 to 8 "returns" so the USA-CERL LAN can determine the incoming baud rate. At the USA-CERL LAN prompt for destination, type "Harris". A control-G will wake up the Harris. The signon is "333CMUG CMUG". The menu options will then be displayed. A bulletin board feature has been added so you can leave messages related to the library for USA-CERL coordinators.

Listed below are abstracts of all programs currently in the Harris library (these change daily, so check the Harris for current availability). Up-to-date copies of the programs are available from USA-CERL. The Harris library contains a more detailed description of each program, so please read the library description before requesting a copy of the program from USA-CERL (ATTN: FS/Jeff Kirby, 800-USA-CERL, ext 274, or FTS 958-7274).

In addition to the programs abstracted, we have just received the following new or revised library submissions:

From SPKCO-C (Mike Sabine):

- SUPERCALC
  - Cost and Earnings Report
  - CWE
  - Operating Budget
  - Work Placement
  - Personnel/Manpower Planning
  - Work Placement and S&A Schedules
- dBase II
  - AMPRS Update System
  - Contract Deficiencies
  - Contract Pay Estimates
  - Submittal/Shop Drawings Comment Labels
  - Personnel Budget

From NPSFO-MC (Steve Miller and L. E. Bender):

- Compiled dBase III
  - Submittal Register
  - Contract Information Management System

From NAPCD-RR (John Williams):

- dBase III
  - Contract Information Management System

From NEDCD-QAB (Scott Leonard):

- dBase III
  - Field Office Automated Reporting System
  - Field Office Automated Log System

By the time you receive this issue of *Construction Micronotes*, these programs will be incorporated into the library. Please dial-up and read the summaries.

I. For Field Office Management

20. S&I Costs

[11] Work Placement and S&A Schedule Tabulates budgeted and actual WP, S&I and S&I rate by month.
SYSTEM: SuperCalc, CP/M, MS-DOS
POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

[12] Division Office Placement & S&A Tracking Record
OCE telephone placement and S&A report, recorded by district and rolled up into a consolidated division report. Allows revisions to projected placement.
SYSTEM: 1-2-3, PC DOS compatible
POC: Glenn Latta, NPDCO-C, FTS 423-3781, comm 503-221-3781

20. Office Budgets

[21] Operating Budget for Resident and District Offices
Calculates budget based on assigned personnel, staffing changes, and operating expenses throughout the year.
SYSTEM: SuperCalc, CP/M, MS-DOS
POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

[22] Personnel/Budget
Updates a file of all personnel in Construction-Operation, calculates effective rate of labor by appropriation, and provides a listing in alphabetical order of any or all organizations. Also provides summary reports by organization/account.
SYSTEM: dBASE II, CP/M or MS-DOS compatible
POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

30. Workload Management

[31] Work Placement
Accumulates estimates of work placement, S&I, and manpower by Resident Office and total district for past and future years.
SYSTEM: SuperCalc, CP/M, CompuPro System 816/C
POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

[32] Work Placement Slippage Analysis
Updates file or estimated amounts and differences between actual and estimated by project and produces reports for work placement slippage analysis. Used to determine reasons for differences between budgeted work placement and actual work placement.
SYSTEM: SuperCalc 2, CP/M, CompuPro System 816/C
POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-2500

80. Utility

(81) Crosstalk User Shell
Menu driven log-on procedures to mainframe and microcomputers, includes DOS functions.
SYSTEM: Crosstalk V3.5 & Hayes Modem, PC-DOS or compatible
POC: Glenn Latta, NPDCO-C, FTS 423-3781, comm 503-221-3781

(82) Quick Modem
Designed to give a sample training session of ON-TYME — electronic mail system — without setting up a training room with multiple phone lines and training IDs.
SYSTEM: Compiled dBASE III, PC-DOS compatible
POC: Ric Shea, SWFAD, FTS 344-4981, comm 817-344-4981

(83) SWD & OCE LOUIS Query System
Used to receive queries written by OCE and to access the MILCON database. Only access for SWD on the AMPRS data extract tape which includes approximately 75 data elements.
SYSTEM: Smartcom/Hayes Modem, PC-DOS compatible
POC: Jean C. Yanowski, SWDCD-C, FTS 729-2444, comm 214-767-2444

90. Other

(91) Audit Report Tracking and Historical Log
Data base log for tracking outstanding audit report request, as well as providing a record for historical reports performed.
SYSTEM: dBASE III, PC-DOS compatible
POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

(92) Contract Payroll Log
Automated log for tracking and reporting on contractors' payroll reports. Replaces ENG Form 3180.
SYSTEM: dBASE III, PC-DOS compatible
POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

(93) Insurance and DD Form 1566 Tracking Log
Automated log for tracking contractors' insurance and DD 1566 documentation. Reports on expired or delinquent documents and the total log.
SYSTEM: dBASE III, PC-DOS compatible
POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

(94) Weighted Guidelines Profit Calculation
Calculates profit base on OCE weighted guidelines as outlined in the EFARS and required as pricing objective.
SYSTEM: Multiplan, PC-DOS compatible
POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

(95) Estimating Forms
Spreadsheet based estimating form formatted after ENG Form 150. Spreadsheet application makes for fast, flexible and accurate estimates. Also provides an easy reference document for future change orders.
SYSTEM: Multiplan, PC-DOS compatible
POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

II. For Contractor Administration and Management

100. Integrated Contract Management System

(101-106) Contract Information and Modification Status (CIMS)
Compiles data based on future, active and post-completion construction activities. Facilitates the collection, storage and retrieval of information pertaining to contract modification and disputes.

(101) CIMS (Version 1.5)
Generates Contract Information Report and Modification Status Report for each contract.
SYSTEM: dBASE II, PC-DOS compatible, or CP/M Televideo
POC: Moonja Kim, CERL-FS, FTS 958-7713, comm 217-373-6713

(102) CIMS and AMPRS (Version Alaska)
Modified CIMS(1.5) and added pay estimate and AMPRS 49 record building. Converted dBASE II progs to dBASE III.
SYSTEM: dBASE III, PC-DOS compatible
POC: Terry Johnson, NPACO-CA, comm 907-753-2759

(103) CIMS (Version 3.01)
Produces Contract Information Report, Payment Record Report and Modification Status Report for each contract.
SYSTEM: dBASE III, PC DOS compatible
POC: Moonja Kim, CERL-FS, FTS 958-7713, comm 217-373-6713

(104) CIMS (Version EUD)
Allows you to use data downloaded from AMPRS by AMDAS and to generate updated file to be uploaded to AMPRS by AMDAS Produces following reports at field offices: Future Project Report, Active Project Report, Post Construction Report, Timeline Report for Specific Proj. Engineer, Timeline Report for All Active Projects, Change Request Report, EUD Form 357A and List of Change Requests.
SYSTEM: dBASE III, PC-DOS compatible
POC: Moonja Kim, CERL-FS, FTS 958-7713, comm 217-373-6713

(105) CIMS (Version ORL District Office 1.0)
Allows you to create files with new contracts to be sent to field offices and to use data updated from field offices. Produces Contract Information Report, Payment Record Report, Construction Inspection Report, Status of Problem Cases, Status of Outstanding Cases (summary table and detailed listing), Modification Status Report, and Finalized Modification Status Report.

SYSTEM: dBASE III, PC-DOS compatible
POC: Moonja Kim, CERL-FS, FTS 958-7713, comm 217-373-6713

[106] CIMS (Version ORL Area Office 1.0)
Allows you to generate files with updated data to be sent to the district office and append new contracts added from the District Office. Produces Contract Information Report, Payment Record Report, Construction Inspection Report, Status of Problem Cases, Modification Status Report, Status of Outstanding Cases, Finalized Modification Status Report.
SYSTEM: dBASE III, PC-DOS compatible
POC: Moonja Kim, CERL-FS, FTS 958-7713, comm 217-373-6713

[107] Construction Field Office Microcomputer Appl. (CFOMA)
Consists of the following applications: Correspondence Tracking, QA/QC Reporting, Payroll Checking, Construction Deficiencies, Time and Attendance, Hardware Schedule, Room Finish Schedule, Training Plans, O&M Data Register, Test Schedule, Final Inspection, Punch List Tracking, and Drawing & Spec Revision Register.
SYSTEM: dBASE III, PC-DOS compatible
POC: L.E. Bender, or Cpt. Rusty Pritchard, NPDDP-D, FTS 399-3696, comm 206-764-3696

[108] Computer Assisted Contract Admin. (CACA 3.1)
Automates administration of construction contract: Contract General Data, Pay Estimate, Mod Register, Fund Status Report, Funding Schedule, Contract Placement Summary, AMPRS report.
SYSTEM: SYMPHONY, PC-DOS compatible
POC: Mark Koenig, NCSCO-CC, FTS 725-7066, comm 612-725-7066

[109] Contract Information and Mod Status (MROFO-RM)
Developed for Area Office or Resident Office. Provides tracking of contracts and mods. Produces the appropriate reports and updates contract value and completion date.
SYSTEM: dBASE III, PC-DOS compatible
POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

[110] SWDCD Support Program
Formulates and formats numerous SWDCD reports using about 25 spreadsheets. Provides the following reports: Civil Construction Progress, Civil Construction Monthly Status, Military Construction Monthly Status, Schedule of Obligations & Expenditures, Monthly Report of Construction Costs, Time & Cost Growth, Notice to Proceed Report, Modification Change Order Status, Manpower Analysis.
SYSTEM: LOTUS 1-2-3, PC-DOS compatible
POC: Jean C. Yanowski, SWDCD-C, FTS 729-2444, comm 214-767-2444

200. Modifications and Claim Status

[201] Construction Contract Claim Status Program
Stores claim information, produces Quarterly Claims Status Report and North Pacific Division Quarterly Status Report of Contract Claims and Appeals
SYSTEM: dBASE II, PC-DOS compatible
POC: Marshal Hopkins, NPW, RTS 434-6500, comm 509-522-6500

[202] Mod Status Log
Keeps track of the status of "Request for Approval of Contract Modifications and/or Overruns." Provides reports to inform users of overdue proposals, delayed negotiations, completed mods, etc.
SYSTEM: dBASE II, CP/M (CompuPro System 816/C) or MS-DOS compatible
POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

300. Submittal Registers

[301-302] Submittal Register Module
Automates ENG Form 4288 data and produces reports: Delinquent Submittals and Overdue Approvals.

[301] Submittal Register Module (Version 1.3)
SYSTEM: dBASE II, PC-DOS compatible, or CP/M Televideo
POC: Moonja Kim, CERL-FS, FTS 958-7713, comm 217-373-6713

[302] Submittal Register Module (Version 3.0)
SYSTEM: dBASE III, PC-DOS compatible
POC: Moonja Kim, CERL-FS, FTS 958-7713, comm 217-373-6713

[303] Shop Drawing & Material Submittal
Automates tracking of shop drawing submittals.
SYSTEM: LOTUS 1-2-3, PC-DOS compatible
POC: Dick Lemke, NCRCD-S, comm 309-788-6361 ext. 6473

[304] Shop Drawing Register
Log tracks all shop drawings in resident office and allows query by dates, specs. Provides helps on each step of query and operation.
SYSTEM: LOTUS 1-2-3, PC DOS compatible
POC: John H. Williams, NPAFO-R, comm 907-864-1218

[305] Submittal Register Log
Incorporates the shop drawing and material drawing schedule provided by contractors and Shop Drawing Register Sheet (SPK Form 251) to help manage and track the entire submittal procedure. Provide reports to inform users of Delinquent Submittals, Submittals not returned within 30 days of receipt, items that have not been resubmitted, and resubmittal traces.
SYSTEM: dBASE II, CP/M (CompuPro System 816/C), or PC-DOS compatible
POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

[306] Submittal Register
Automated tracking and reporting of multiple contractors' shop drawing submittals registers. Prints open and 'C' action entries. Searches for word, spec,

word and spec, and ID number. Sorts and reports on the same.

SYSTEM: dBASE III, PC-DOS compatible

POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

410. Correspondence /RFI Tracking

[411] Division Office Fund Request Log – dBASE III

Track status of funds requests and provides historical records. Provides list of pending actions and historical funding information by projects.

SYSTEM: dBASE III, PC-DOS compatible

POC: Glenn Latta, NPDCO-C, FTS 423-3781, comm 503-221-3781

[412] Findings of Fact Format

WordStar format for typing findings of fact for a contract modification.

SYSTEM: WordStar, PC-DOS compatible

POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

[413] ENG Form 393BB

WordStar format for typing findings of fact for a contract modification subsequent to settlement.

SYSTEM: WordStar, PC-DOS compatible

POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-2256/7, comm 303-579-9330

500. Progress Payments

[501] Contract Pay Estimates

Creates and updates Contract, Vendor and Bid Item Files. Calculates amounts due to contractors, overruns, and underruns. Prints pay estimate reports which can replace ENG 93 and 93A.

SYSTEM: dBASE II, CP/M (CompuPro System 816/C), or PC-DOS compatible

POC: Mike Sabine, SPKCD-C, FTS 460-2500, comm 916-551-2500

[502] Pay Estimate

Automates data input and produces reports that can replace ENG 93 and 93A. Uses macro features of LOTUS 1-2-3.

SYSTEM: LOTUS 1-2-3, PC-DOS compatible

POC: Dick Lemke, NCRCD-S, comm 309-788-6361 ext. 6473

[503] Office Engineering Model

Generates payment estimates, progress report, budget report, and historical archive of construction placement.

SYSTEM: SYMPHONY, PC-DOS compatible

POC: Royce Collins, ORNCD-E, FTS 852-5674, comm 615-251-5674

[504] Pay Estimate Form (ENG form 93)

Spreadsheet based form for processing pay applications. Replaces ENG Form 93.

SYSTEM: Multiplan, PC-DOS compatible

POC: Cpt Scott Prosuch, MROFO-RM, FTS 323-256/7, comm 303-579-9330

600 General Contract Information

[601] Contract Management System

Maintains information on contracts from design phase through final payment. Provides project book identifying current status of contracts, emergency phone listing, status report for inhouse use and numerous other customized reports.

SYSTEM: dBASE III, PC-DOS compatible

POC: Russell Holeman, SWF, FTS 747-4109, comm 817-287-4109

III. AMPRS Interface

[801] AMPRS Update System

A menu-prompt, screen system that builds files in AMPRS card image format to be sent to Honeywell for all AMPRS records.

SYSTEM: dBASE II and dBASE III CP/M (CompuPro System 816/C), or MS-DOS compatible

POC: Mike Sabine, SPKCO-C, FTS 460 2500, comm 916-551-2500

IV. Miscellaneous (Note: programs 906 and 907 are not featured here due to space constraints)

[901] Emergency Management

Prepares reports for managing emergency flood control program (PL84/99)

SYSTEM: dBASE II, CP/M (CompuPro System 816/A), or MS DOS compatible

POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

[902] Earthwork Computations

Computes earthwork quantities by average end area methods. Curve and angle corrections are provided. Provides reports on cross-sectional area intermediate volumes and accumulated volumes. Option to plot on section to dot matrix printer.

SYSTEM: Apple III Basic or PC-DOS compatible Basic

POC: Alan Hunter, LMXVIAO, FTS 497-7493, comm 318-336-5226

[903] Exchange

Designed to aid in the analysis of exchange rate fluctuations on cash flows and net present worth for international construction projects.

SYSTEM: LOTUS 1-2-3, PC-DOS compatible

POC: Cpt Stephen Thomas, SPNDE-SF, comm 415-331-0404

[904] Contract Deficiency Program

SYSTEM: dBASE II, CP/M (CompuPro System 816/C) or MS-DOS compatible

POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

[905] Engineering Review Comments Label

Generates Shopdrawing Review comments on labels.

SYSTEM: dBASE II, CP/M (CompuPro System 816/C) or MS DOS compatible

POC: Mike Sabine, SPKCO-C, FTS 460-2500, comm 916-551-2500

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